



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

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

**220kV LINE RELAY SET-2 PANEL  
=D02+R2**

**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	
2.	220kV GIS LCC Schematic Drawings			P60194-E-GISS-001	
REVISION HISTORY					
REV	DATE	DRW. BY	CHK. BY	APR. BY	REVISION DESCRIPTION
0	20.11.2018	ASJ	MFT	NAH	AS BUILT
Scale				Sheet size	
NOT-TO-SCALE				A3	
Client					
		NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)			
Contractor			Manufacturer		
 Grid Solutions 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					
220kV LINE RELAY SET-2 PANEL SCHEMATIC DRAWINGS					
Order no			Document no		
P-60194			P60194-E-RLC-SC-002		
Sheet type		Total sheets		Sheet no	
A		35		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	05
A 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.	01	A	Cover Sheet			X	X									A
	02	AA1	List Of Contents			X	X									B
	03	AA2	List Of Contents			X	X									C
	04	AB	Symbol and Legends			X	X									D
	05	AC1	Component List			X	X									E
	06	AC2	Component List			X	X									F
	07	AD	Panel View			X	X									
	08	AE	Bay Concept & Protection Logice			X	X									
	09	D	AC Supply Distribution Circuit			X	X									
	10	E	DC Supply Distribution Circuit			X	X									
	11	F	AC/DC Supply Failure Circuit			X	X									
	12	G	Relay Control & Supply Circuit			X	X									
	13	H1	Distance Relay Protection CT/VT Circuit			X	X									
	14	H2	Autorecloser VT Input Circuit			X	X									
	15	H3	Distance Relay Protection CT/VT Circuit			X	X									
	16	I1	Distance Relay input Circuit			X	X									
	17	I2	Auto Recloser Input Circuit			X	X									
	18	I3	Auto Recloser Input Circuit			X	X									
	19	I4	System Input Circuit			X	X									
	20	K1	Protection Trips Circuit			X	X									
	21	K11	Trips Circuit for Coil-1			X	X									
	22	K12	Trips Circuit for Coil-2			X	X									
	23	NA1	System Alarm Circuit			X	X									
	24	NA2	System Alarm Circuit			X	X									
	25	NA3	System Alarm Circuit			X	X									
	26	PA1	Protection Inter Circuit			X	X									
	27	PA2	Protection Inter Circuit			X	X									
	28	RA1	Annunciation Circuit			X	X									
	29	RA2	Event & Fault Recorder Circuit			X	X									
	30	RA3	Annunciation Circuit			X	X									
	31	Z1	Component Diagram			X	X									
0	AS BUILT			20.11.2018	ASJ	 <b>EPE SOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	 <b>Grid Solutions</b> A GE and Alstom joint venture	 <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE		Title 220KV LINE RELAY SET-2 PANEL (=D02+R2) LIST OF CONTANTS		Drawing no. P60194-E-RLC-SC-002			
REV.	DESCRIPTION			DATE	DRAWER						Project no. P-60194	Sheet type AA1	Sheet no. 02			

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	PAGE NO.	SHEET NAME	SHEET DESCRIPTION	ISSUE / REVISION									
				A	B	C	D	E	F	01	02	03	04
<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>	32	Z2	Component Diagram		X	X							
	33	Z3	Component Diagram		X	X							
	34	Z4	Component Diagram		X	X							
	35	Z5	Component Diagram		X								
	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 220KV LINE RELAY SET-2 PANEL (=D02+R2) LIST OF CONTENTS	Drawing no. P60194-E-RLC-SC-002			
REV.	DESCRIPTION	DATE	DRAWER										
1	2	3	4	5	6	7	8						

	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A		CIRCUIT BREAKER		MINIATURE CIRCUIT BREAKER		AUXILIARY CONTACTOR NO+NC	21	DISTANCE
B		SWITCH/ISOLATOR		KEY OPERATED SELECTOR SWITCH		AMMETER	24	OVEREXCITATION
C		EARTHING		LIMITED SWITCH		VOLTMETER	25	SYNCHROCHECK
D		SF6 TO AIR BUSHING		HUMIDITY & TEMPERATURE CONTROLLER		POWER FACTOR METER	49	THERMAL OVERLOAD
E		LINE TRAP		PANEL HEATER		DIGITAL PANEL METER	50/51	PHASE INST./OVERCURRENT
F		SURGE ARRESTOR		THREE PIN SOCKET		ACTIVE POWER METER	50N/51N	EARTH INST./OVERCURRENT
G		CURRENT TRANSFORMER		INDICATION LIGHT		REACTIVE POWER METER	50BF	CIRCUIT BREAKER FAILURE
H		COUPLING CAPACITOR VOLTAGE TRANSFORMER		PUSH BUTTON		ENERGY METER	64	RESTRICTED EARTH FAULT
I		POWER TRANSFORMER		AUXILIARY CONTACTOR COIL			67N	DIRECTIONAL EARTH FAULT
J		AUTO TRANSFORMER		POWER SUPPLY AC/DC			68	POWER SWING BLOCKING
K				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	DIFFERENTIAL CONNECTION
P							87BB	DIFFERENTIAL BUSBAR

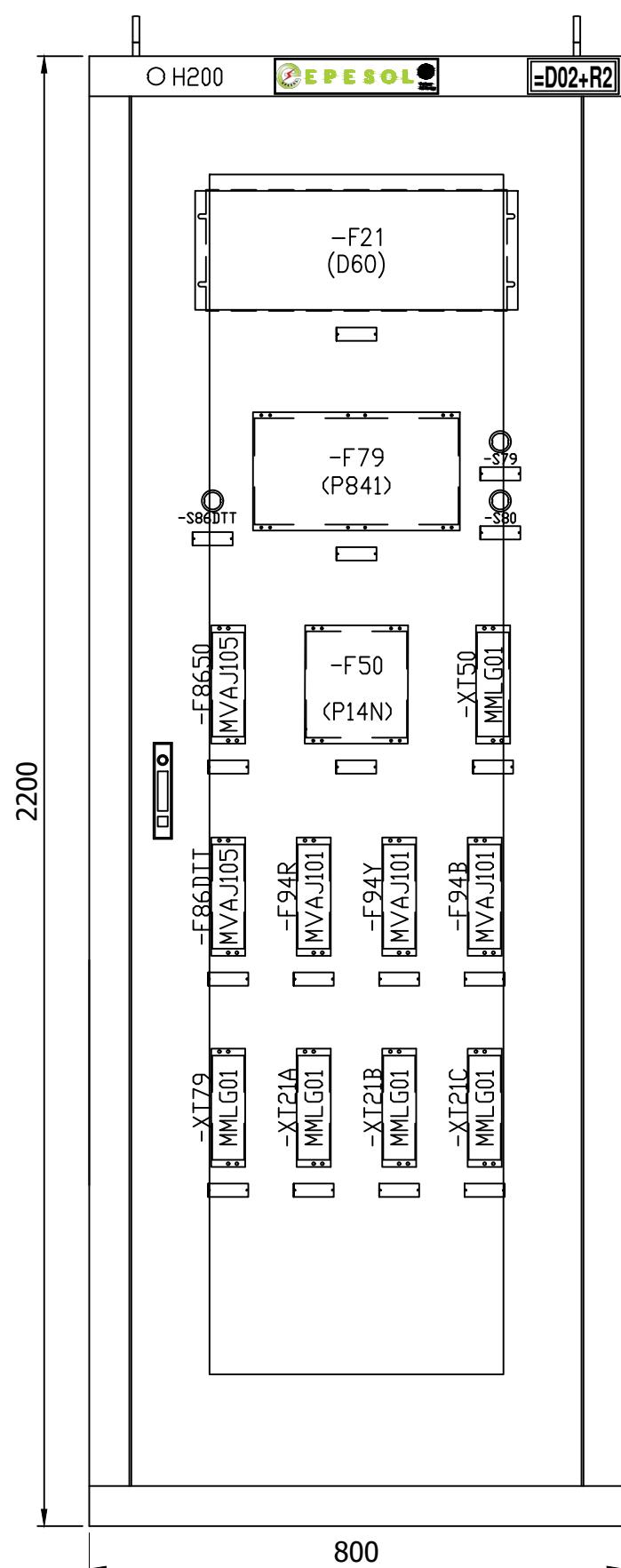
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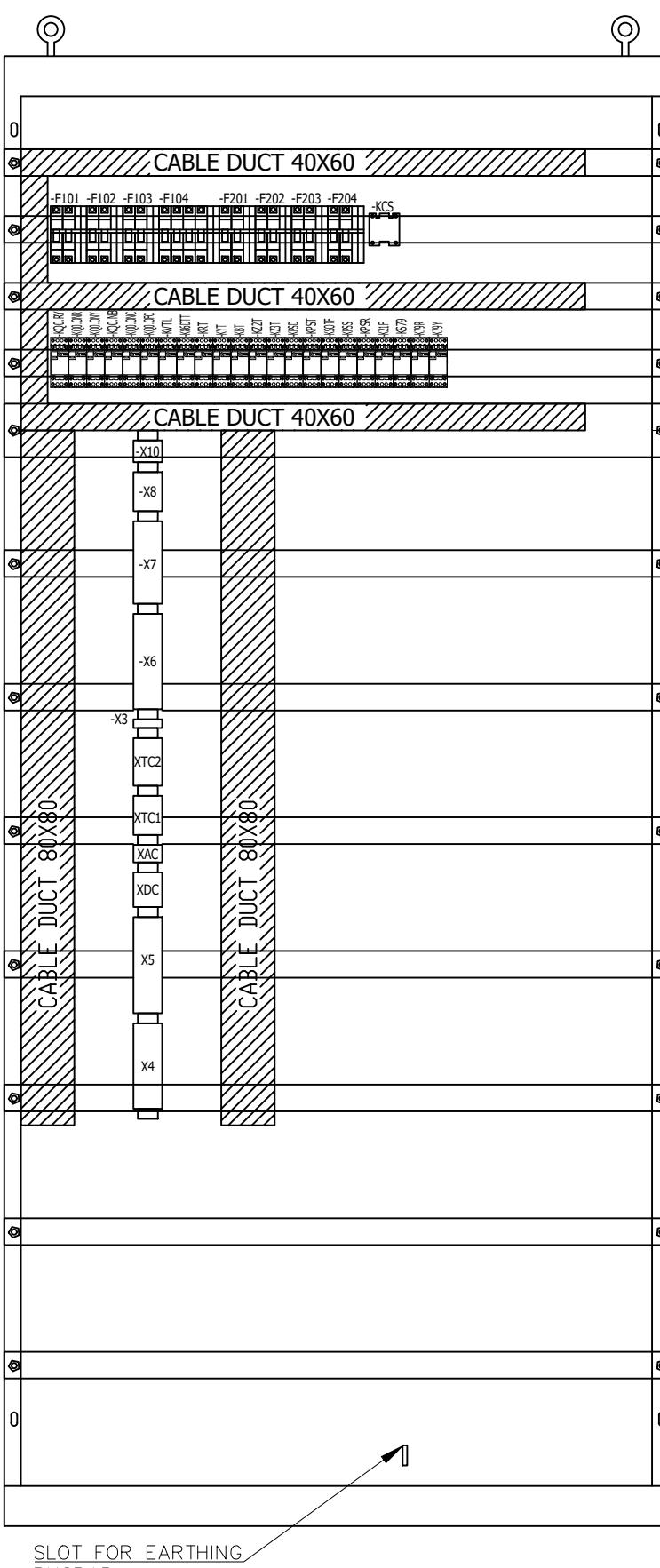
	1	2	3	4	5	6	7	8
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER	
A	01	DISTANCE PROTECTION RELAY	MULTILIN D60, Cortec: D60-U03-HKH-F8L-H6D-M4L-P4L-U6U-W6U  Supply: 125-250VDC / 100-240VAC@50Hz, 4 VT + 4 CT (50-240VAC:1/5A) Inputs  24 Opto Inputs, 40 Relay Outputs	-F21		GE		
	01	OVERCURRENT EARTHFAULT RELAY	AGILE P14N, Cortec: P14N-B16A7C0570A  Supply: 24-250VDC / 110-240VAC, 4 CT (1/5A) Inputs  8 Opto Inputs, 8 Relay Outputs	-F50		GE		
	01	AUTO RECLOSE RELAY	AGILE P841, Cortec: P841-91BA7M0810M  Supply: 110-250VDC / 100-240VAC, 4 VT + 3 CT (100-120V:1/5A) Inputs  16 Opto Inputs, 14 Relay Outputs	-F79		GE		
B	05	TEST BLOCK	MMLG01, Cortec: MMLG01-R1AA9002D	-XT21A-C,-XT50,-XT79		GE		
	03	TRIPPING RELAY (SELF-RESETTING)	MVAJ101, Cortec: MVAJ101-RA1002A  Supply: 220-250VDC, 8 NO + 2 NC Contacts	-F94R,-F94Y,-F94B		GE		
	02	TRIPPING RELAY (HAND/ELECTRICAL RESET)	MVAJ105, Cortec: MVAJ105-RA1002A  Supply: 220-250VDC, 8 NO + 2 NC Contacts	-F8650,-F86DTT		GE		
C	02	CONTROL MCB - PANEL LIGHT & HEATER	G62C02+CAH(2), 2-Pole, Ratings: 2A, 230VAC, 6kA @ 230VAC, 2 CO Contacts	-F101-102		GE		
	01	CONTROL ELCB - PANEL SOCKET	DM100C16/030+CAH(2), 2-Pole, Ratings: 16A, 30mA, 230VAC, 10 kA @ 230VAC, 2 CO Contacts	-F103		GE		
	04	CONTROL MCB - DC DISTRIBUTION	EP102UCC04+CAH(2), 2-Pole, Ratings: 4A, 220VDC, 10kA @ 250VDC, 2 CO Contacts	-F201-204		GE		
D	01	AC MCB - VT CIRCUIT	G64C02+CAH(2), 4-Pole, Ratings 2A, 240 VAC, 6kA, 2 CO Contacts	-F104		GE		
	01	SELECTOR SWITCH - AUTORECLOSER IN-OUT	YS-AK-2-2-44-D, 2 Position, Ratings: 10A, 220VDC, Keylockable on both positions	-S79		YONGSUNG ELECTRIC CO., LTD.		
	01	SELECTOR SWITCH - AUTORECLOSER 1PH-3PH	YS-AK-2-2-44-D, 2 Position, Ratings: 10A, 220VDC, Keylockable on both positions	-S80		YONGSUNG ELECTRIC CO., LTD.		
E	01	PUSHBUTTON - DISTANCE TRANSFER TRIP RELAY RESET	YS-AP1-2-40-B-D-W, Push Button Black, Spring return, Ratings: 10A, 220VDC	-S86DTT		YONGSUNG ELECTRIC CO., LTD.		
	01	INDICATION LAMP - DC SUPPLY FAILURE	YS-PL-2-AL-22-R-W, Type: Integrated LED , Color : RED , Supply : 230VAC @ 50Hz	-H200		YONGSUNG ELECTRIC CO., LTD.		
	32	AUXILIARY CONTACTOR	PRC4M40DCML, Coil Voltage: 220VDC, 4 CO Contacts	-KAC,-KS79,-KQ0.RY/ONR/ONY/OYB/ONC/OFC,-KVTL  -K86DTT,-KRT/YT/BT/Z2T/Z3T,-KPSD/T,-KSOTF,-KPR/S,  -K21F,-K79R/Y/B/L/F,-K50L/H/F,-KDCM,-KDC1/2		GE		
F	01	AUXILIARY CONTACTOR	MCRC022ATWN+MARN211AT, Coil Voltage: 220VDC, 3 NO + 3 NC Contacts	KCR		GE		
	02	AUXILIARY CONTACTOR	PRC4M40ANL, Coil Voltage: 230VAC, 4 CO Contacts	-KACM, -KDC		GE		
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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 LIGHT	YST8-30-5W+YSP315GW-B, 230VAC @ 50HZ, 5W, WITH DOOR LIMIT SWITCH			-H100,-S100	YONGSUNG ELECTRIC CO., LTD.				
	01	THREE PIN SOCKET	1N+PE, 16A, 230VAC @ 50Hz			-X100	LEAR				
	01	PANEL HEATER	230VAC @ 50Hz, 50W			-R100	E-LABS				
	01	HUMIDITY & TEMPERATURE CONTROLLER	40-90%RH, 25-50 deg.C, 230VAC @ 50Hz			-B100	E-LABS				
B	4	TERMINAL BLOCK FOR AC SUPPLY DISTRIBUTION	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XAC	CABUR				
	8	TERMINAL BLOCK FOR DC SUPPLY DISTRIBUTION	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XDC	CABUR				
	16	TERMINAL BLOCK FOR CT CIRCUIT	SCB-6, Screw Type, Feed Through Terminal			-X4	CABUR				
	18	TERMINAL BLOCK FOR VT CIRCUIT	SCB-6, SCREW TYPE, FEED THROUGH TERMINAL			-X5	CABUR				
C	2	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X3	CABUR				
	22	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X6	CABUR				
	19	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X7	CABUR				
	9	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X8	CABUR				
D	5	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X10	CABUR				
	9	TERMINAL BLOCK FOR TRIP CIRCUIT 1	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XTC1	CABUR				
	11	TERMINAL BLOCK FOR TRIP CIRCUIT 2	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XTC2	CABUR				
	5	TERMINAL BLOCK FOR AR INITIATION/BLOCKING	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X22	CABUR				
E	2	TERMINAL BLOCK FOR CB CLOSE BLOCK	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X23	CABUR				
	8	TERMINAL BLOCK FOR AR CLOSE COMMAND	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X24	CABUR				
	3	TERMINAL BLOCK FOR BFI	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X25	CABUR				
	26	TERMINAL BLOCK FOR ANNUNCIATION	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XAN	CABUR				
F	15	TERMINAL BLOCK FOR SIGNALLING TO EVENT RECORDER	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XEN	CABUR				
	6	TERMINAL BLOCK FOR SIGNALLING TO FAULT RECORDER	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XFR	CABUR				
	12	TERMINAL BLOCK FOR SIGNALLING TO SCADA INTERFACE PANEL	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XSC	CABUR				
	0	AS BUILT	20.11.2018	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 220kV LINE RELAY SET-2 PANEL (=D02+R2) COMPONENT LIST	Drawing no. P60194-E-RLC-SC-002	
REV.	DESCRIPTION		DATE	DRAWER					Project no. P-60194	Sheet type AC2	Sheet no. 06

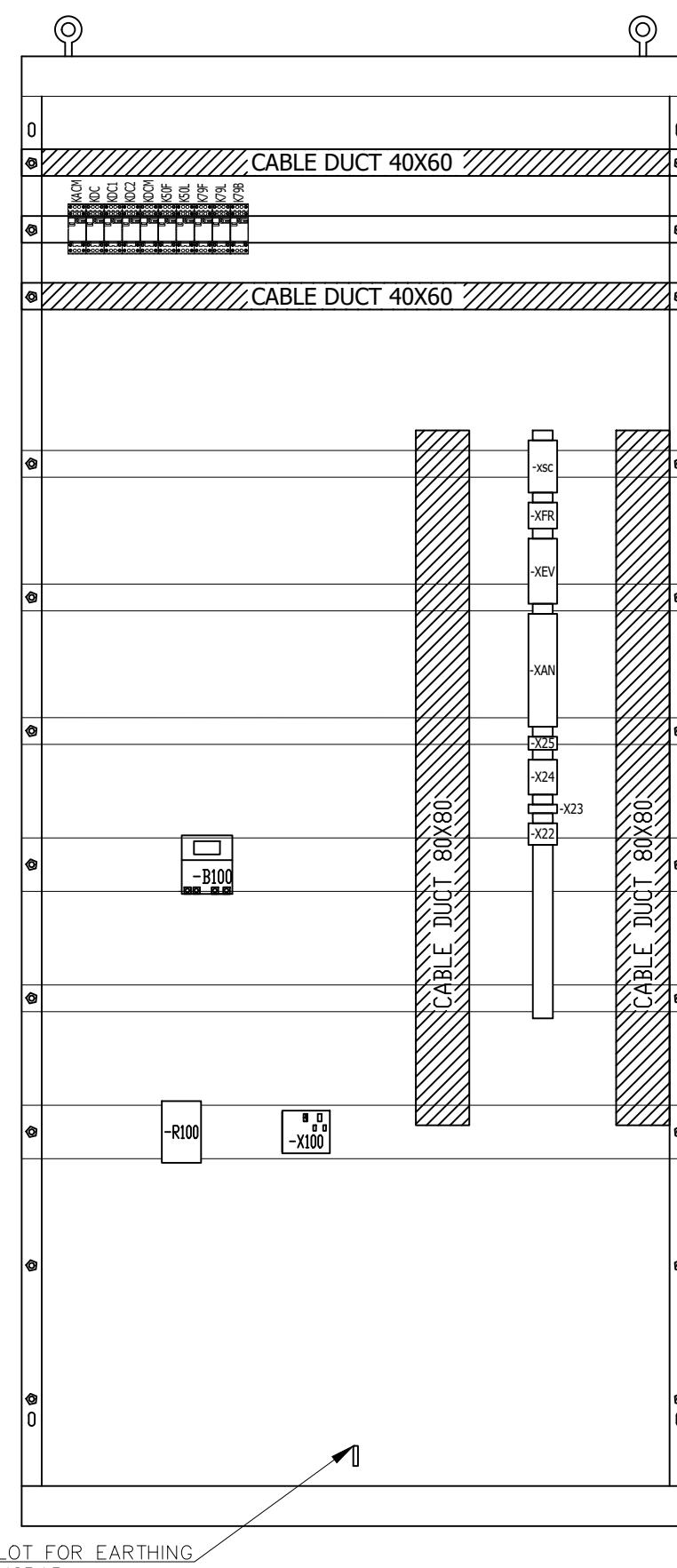
FRONT VIEW



**LEFT SIDE VIEW**



## RIGHT SIDE VIEW

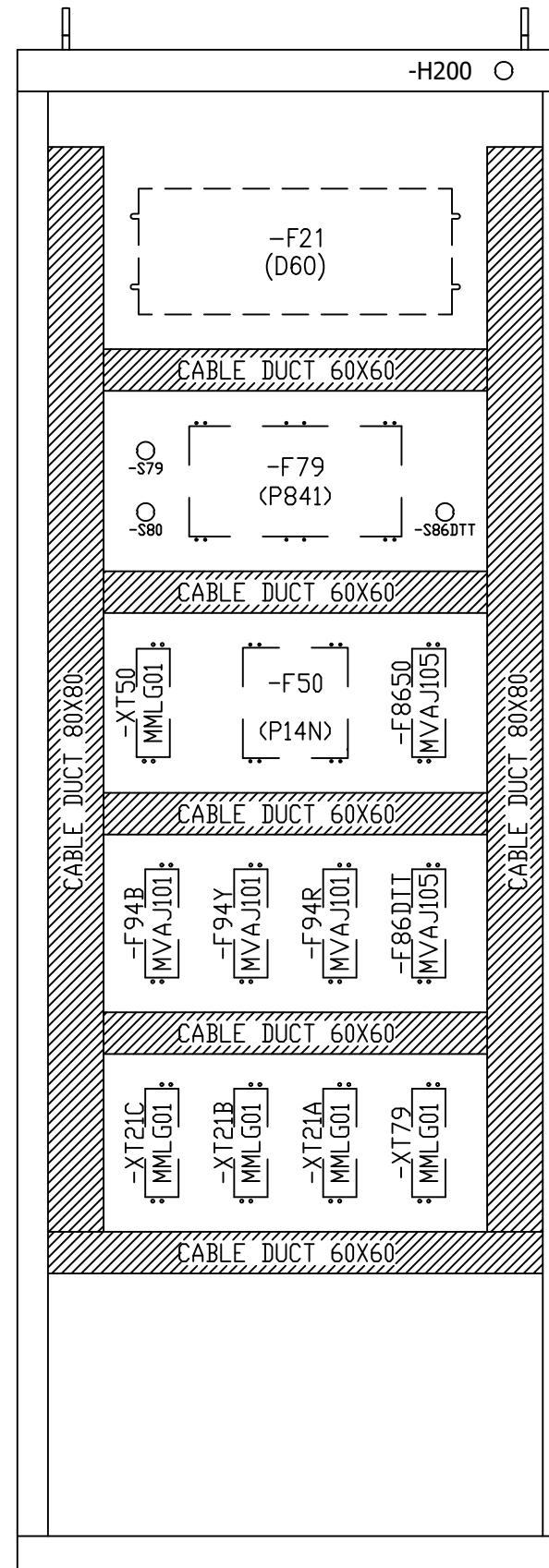


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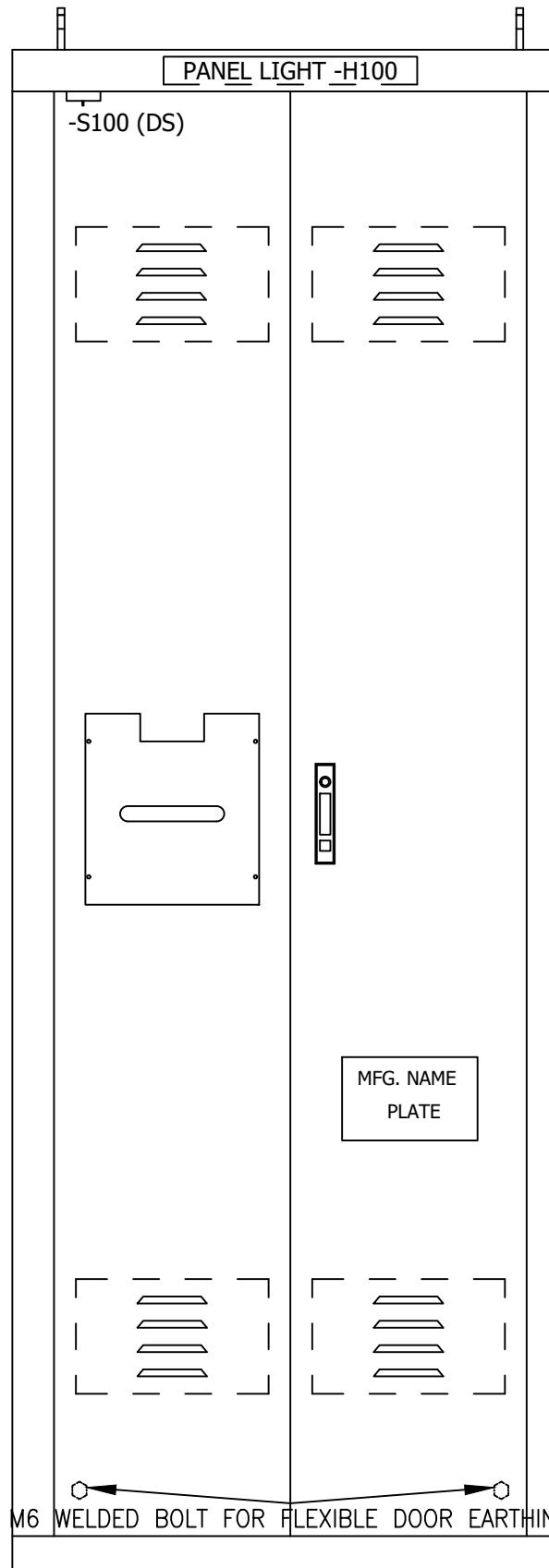
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								P60194-E-RLC-SC-001			
								Project no.			
								P-60194	AD	07	
REV.	DESCRIPTION	DATE	DRAWER								

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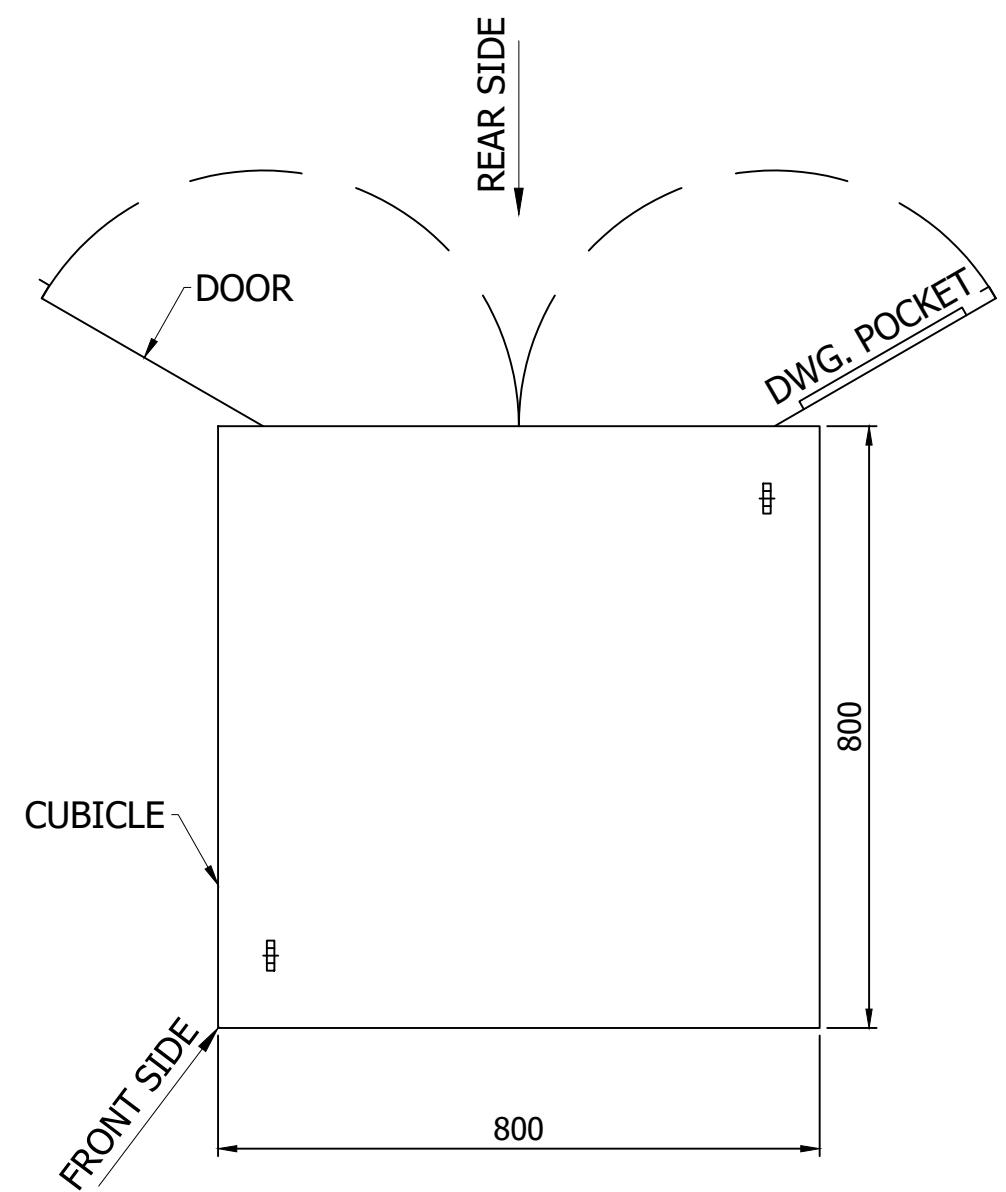
## BACK VIEW WITHOUT DOOR



## BACK VIEW WITH DOOR



## TOP VIEW



## **NOTE:-**

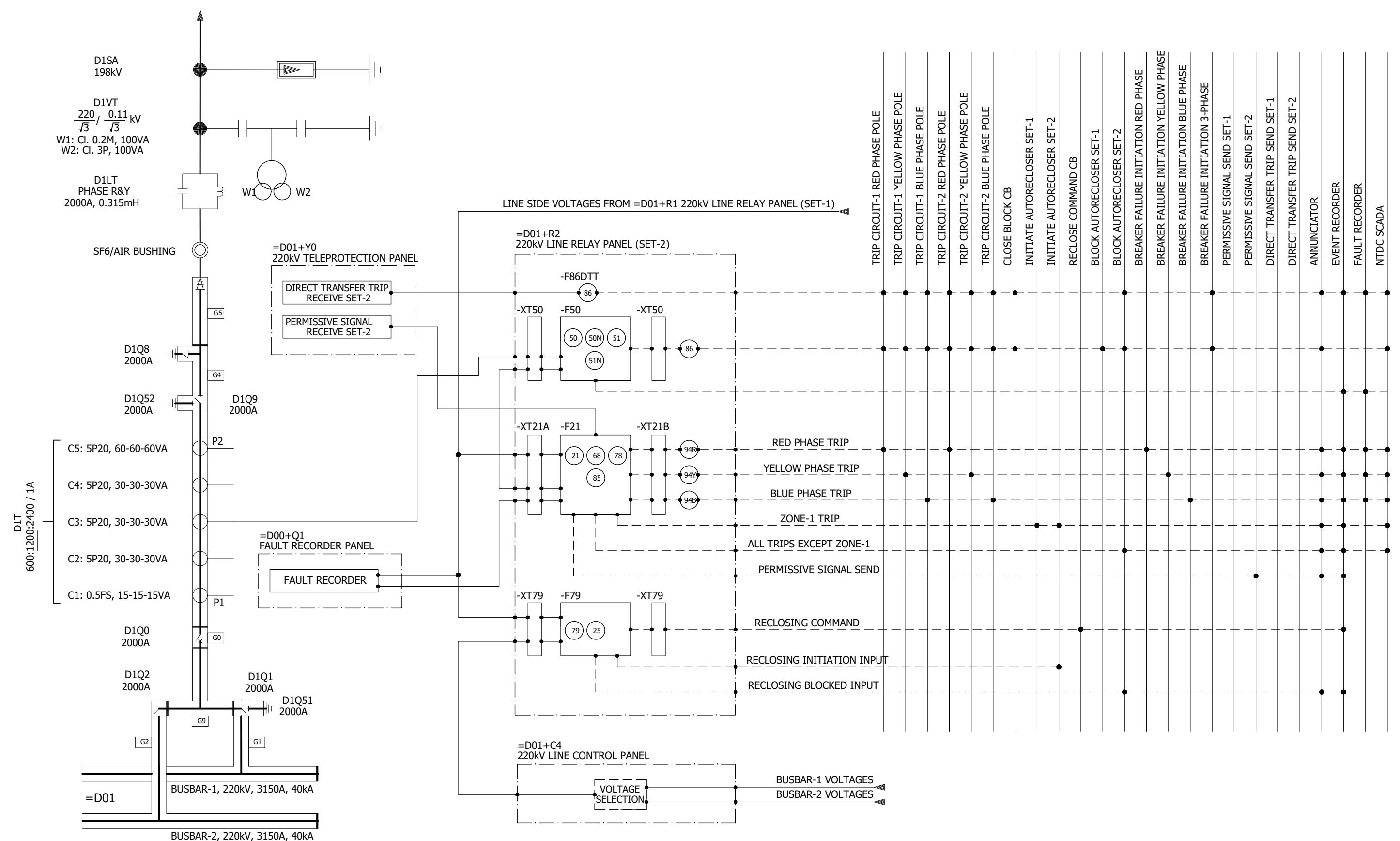
- 1 - PANEL DIMENSION: 800 x 1000 x 2200mm (WxDxH)
  - 2 - COLOR : RAL 7032
  - 3 - SHEET THICKNESS : 2 - 2.5 mm
  - 4 - PROTECTION CLASS : IP-51 (INDOOR TYPE)
  - 5 - ALL DOOR FITTED WITH 16mm EARTH STRAP & INSULATED WITH GREEN-YELLOW COLOUR.

0	AS BUILT	20.11.2018	ASJ	Manufacturer  <b>EPESOL</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 220kV LINE RELAY SET-1 PANEL (=D02+R2) PANEL VIEW	Drawing no. P60194-E-RLC-SC-002	
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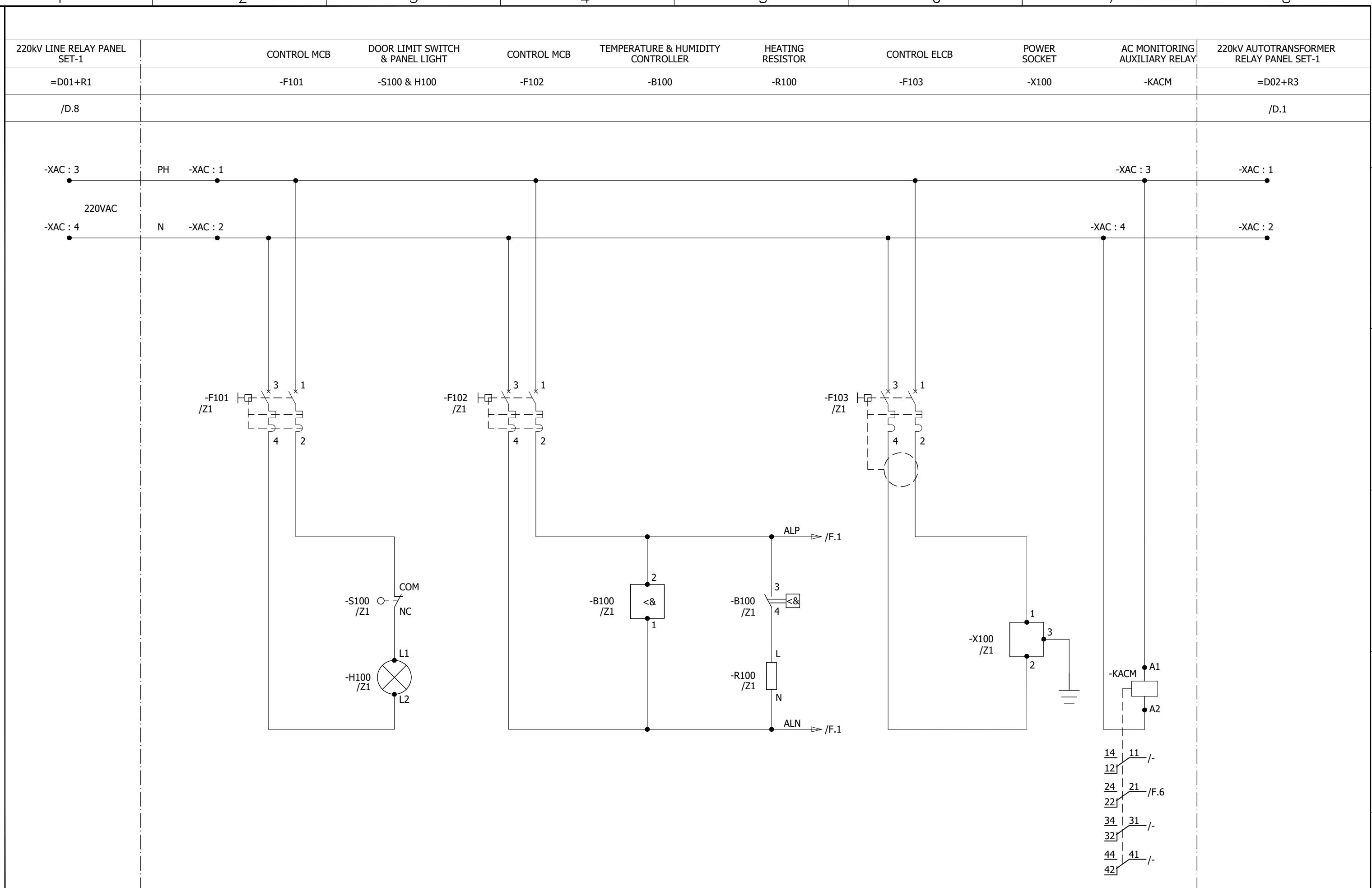
## 220kV KSK

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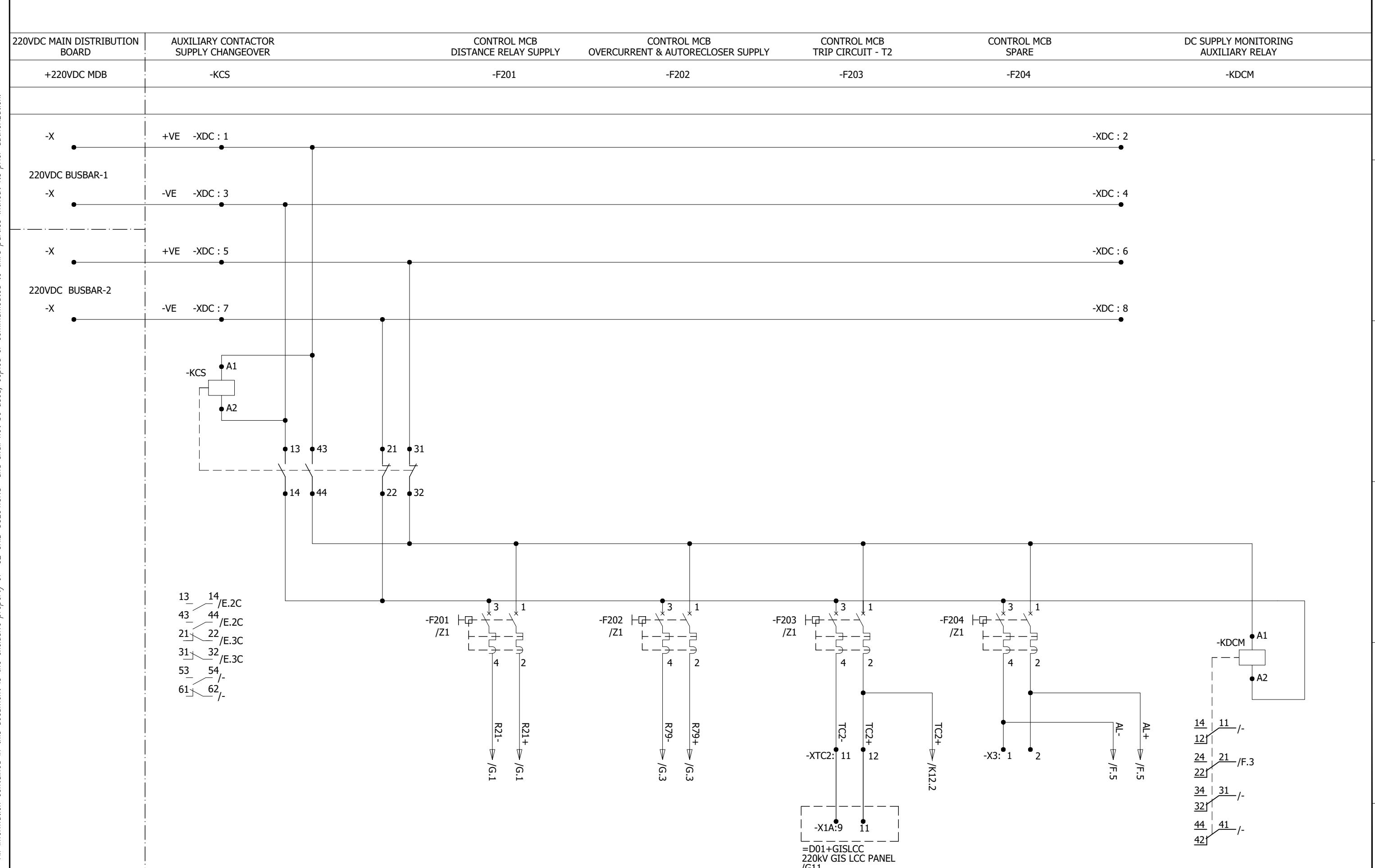
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								Sheet no. 08	



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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 220KV LINE RELAY SET-2 PANEL (=D02+R2) DC SUPPLY DISTRIBUTION	Drawing no. P60194-E-RLC-SC-002
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type E

1 2 3 4 5 6 7 8

## 220V DC CIRCUIT FAULTY

## 220V DC CIRCUIT FAULTY INDICATION

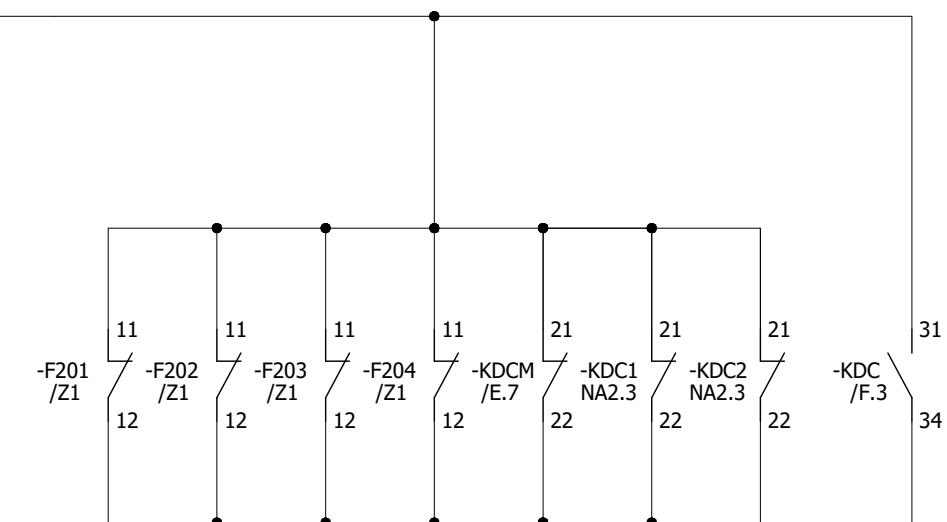
## 220V AC CIRCUIT FAULTY

-KDC

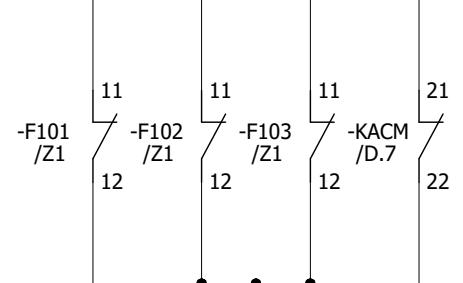
-H200

-KAC

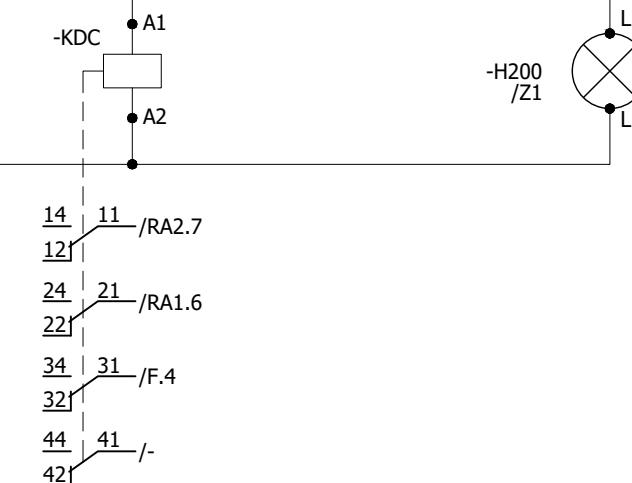
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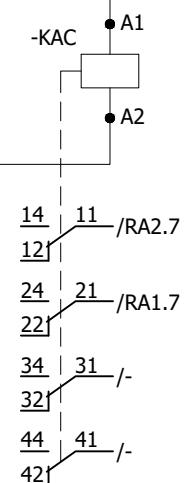
/E.5 ➤ AL+



/D.5 ➤ ALN



/E.5 ➤ AL-



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									Sheet type F
									Sheet no. 11

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RESET PUSHBUTTON  
DIRECT TRANSFER TRIP RELAY

DISTANCE PROTECTION

AUTO RECLOSE

AUTO RECLOSE

OVERCURRENT &  
EARTHFAULT

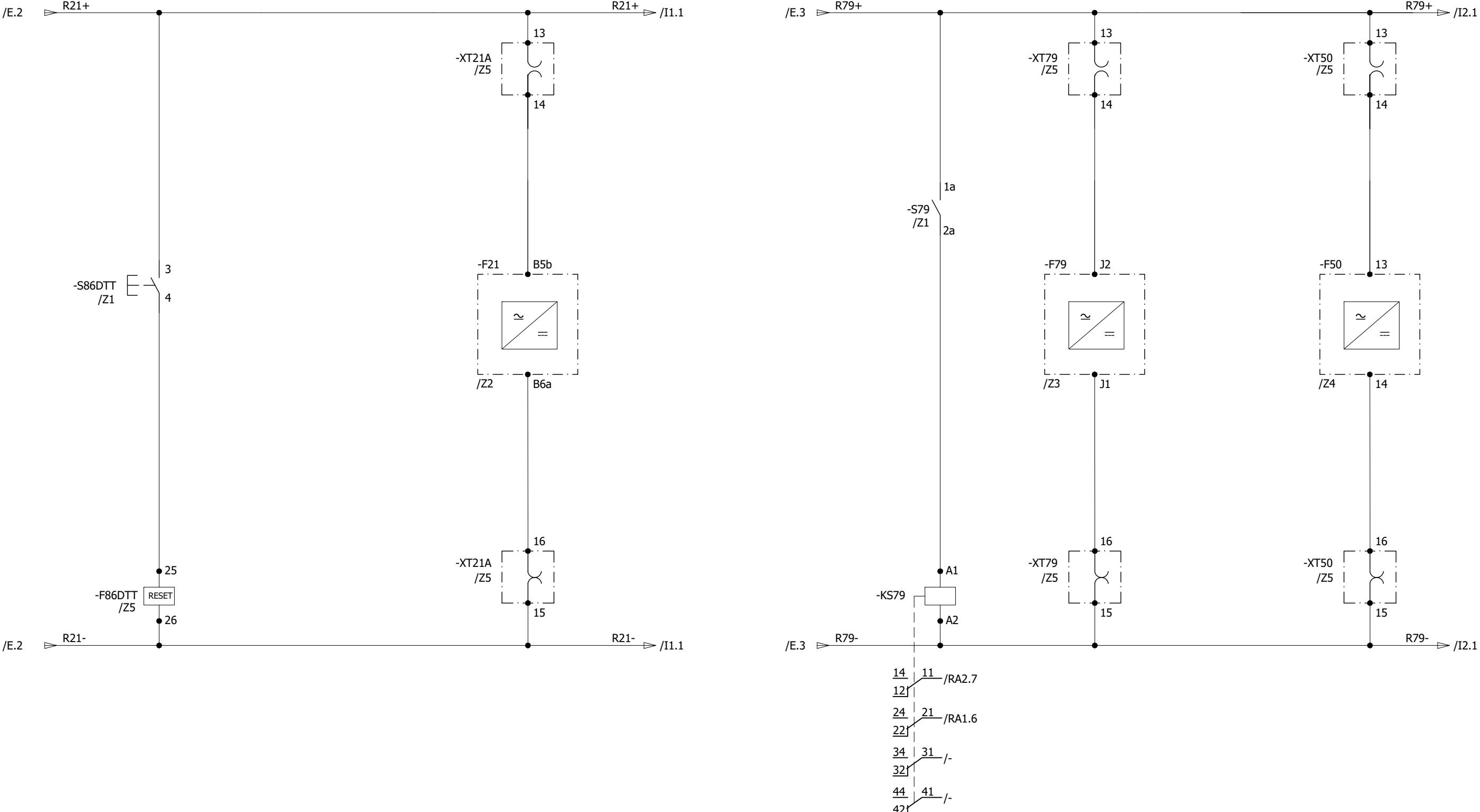
-S86DTT

RELAY SUPPLY

IN/OUT

RELAY SUPPLY

RELAY SUPPLY



0 AS BUILT 20.11.2018 ASJ

Manufacturer  
**EPE SOL**  
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  
220kV LINE RELAY SET-2 PANEL  
(=D02+R2)  
RELAY CONTROL & SUPPLY

Drawing no.  
P60194-E-RLC-SC-002

Project no. P-60194 Sheet type G Sheet no. 12

REV.

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## TEST BLOCK

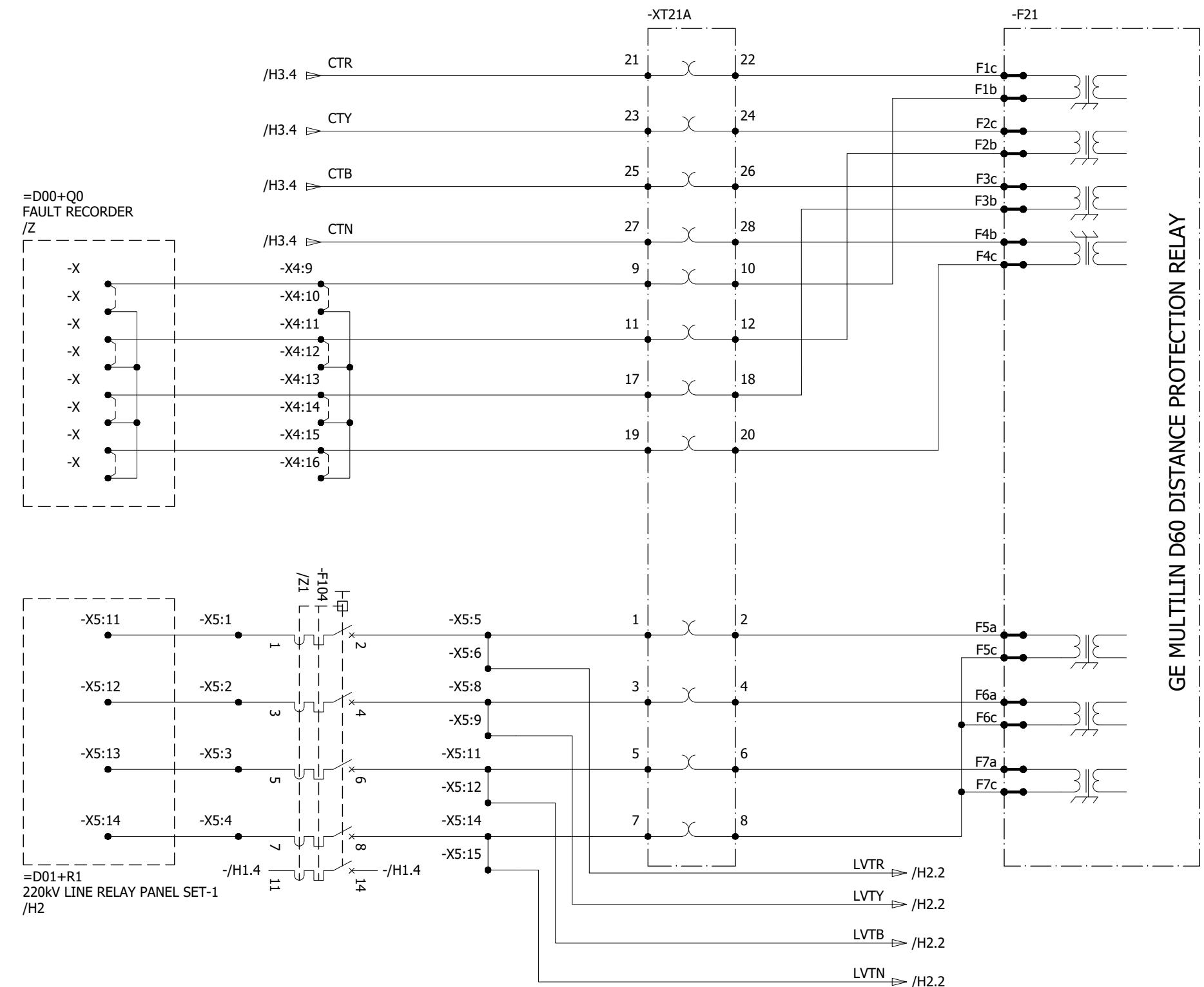
## DISTANCE PROTECTION RELAY

-XT21A

-F21

/Z5

/Z2



A

A

B

B

C

C

D

D

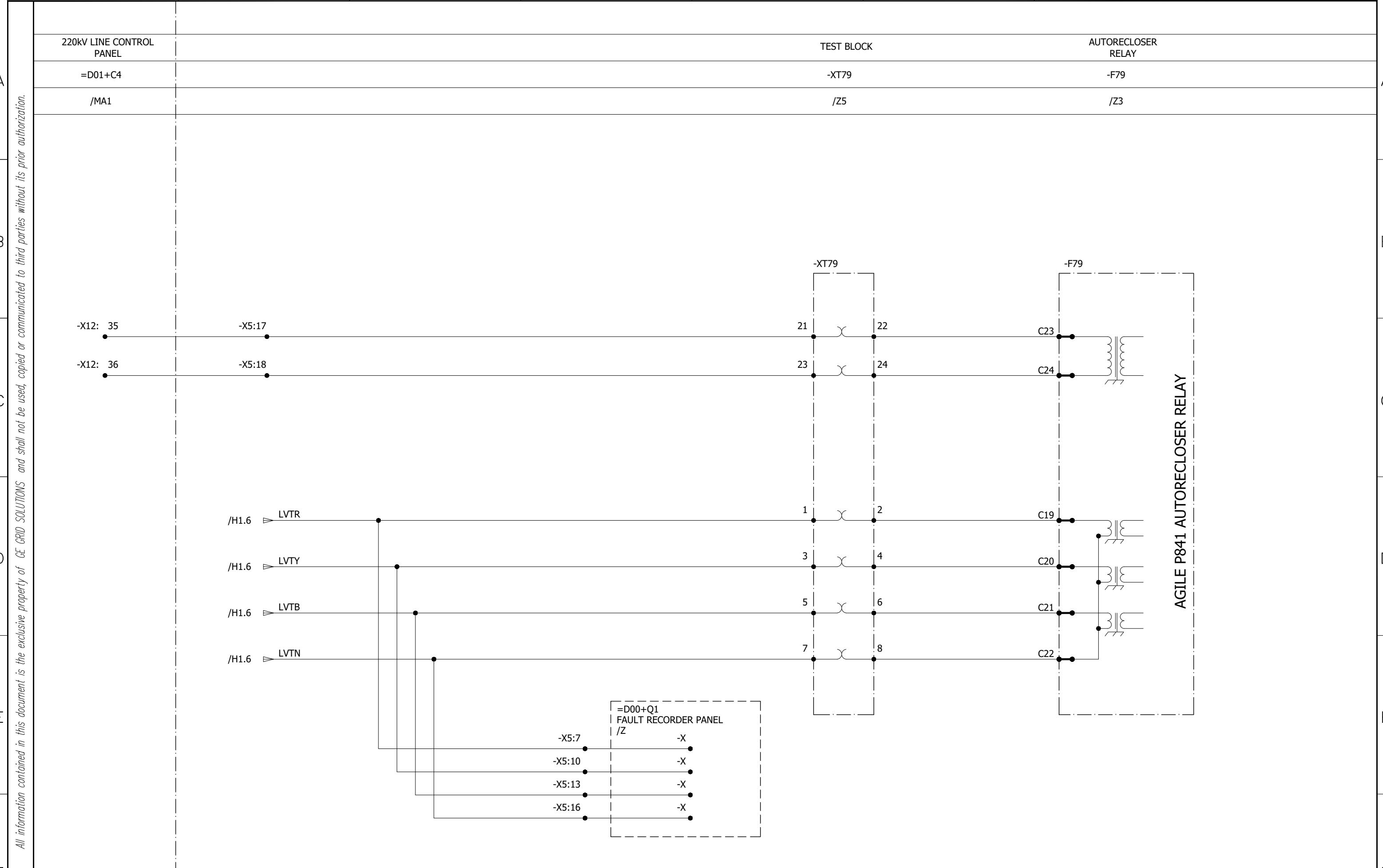
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E

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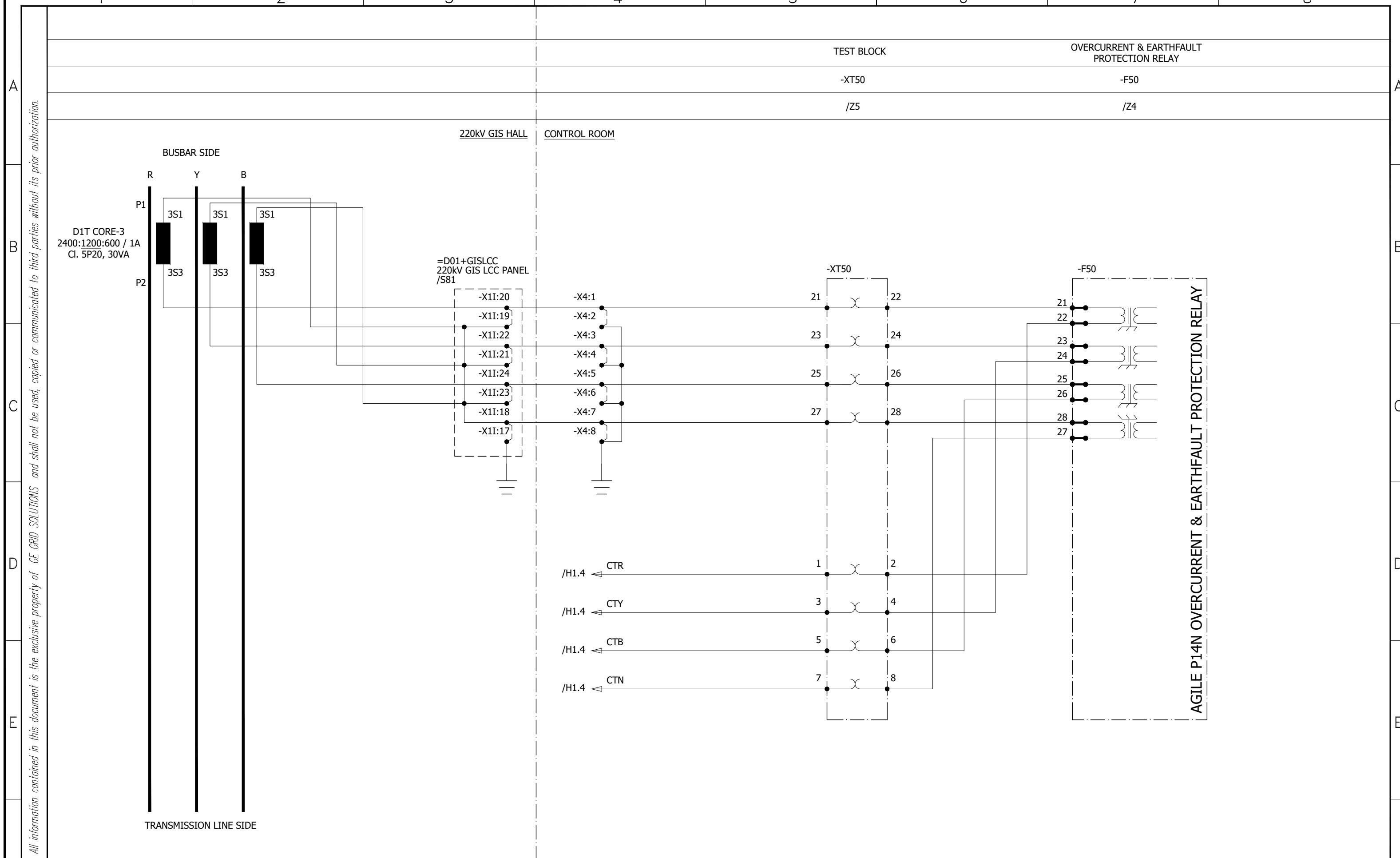
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0	AS BUILT	20.11.2018	ASJ	Manufacturer <b>EPESEL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV LINE RELAY SET-2 PANEL (=D02+R2) DISTANCE PROTECTION CT/VT CIRCUIT	Drawing no. P60194-E-RLC-SC-002	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type H1	Sheet no. 13



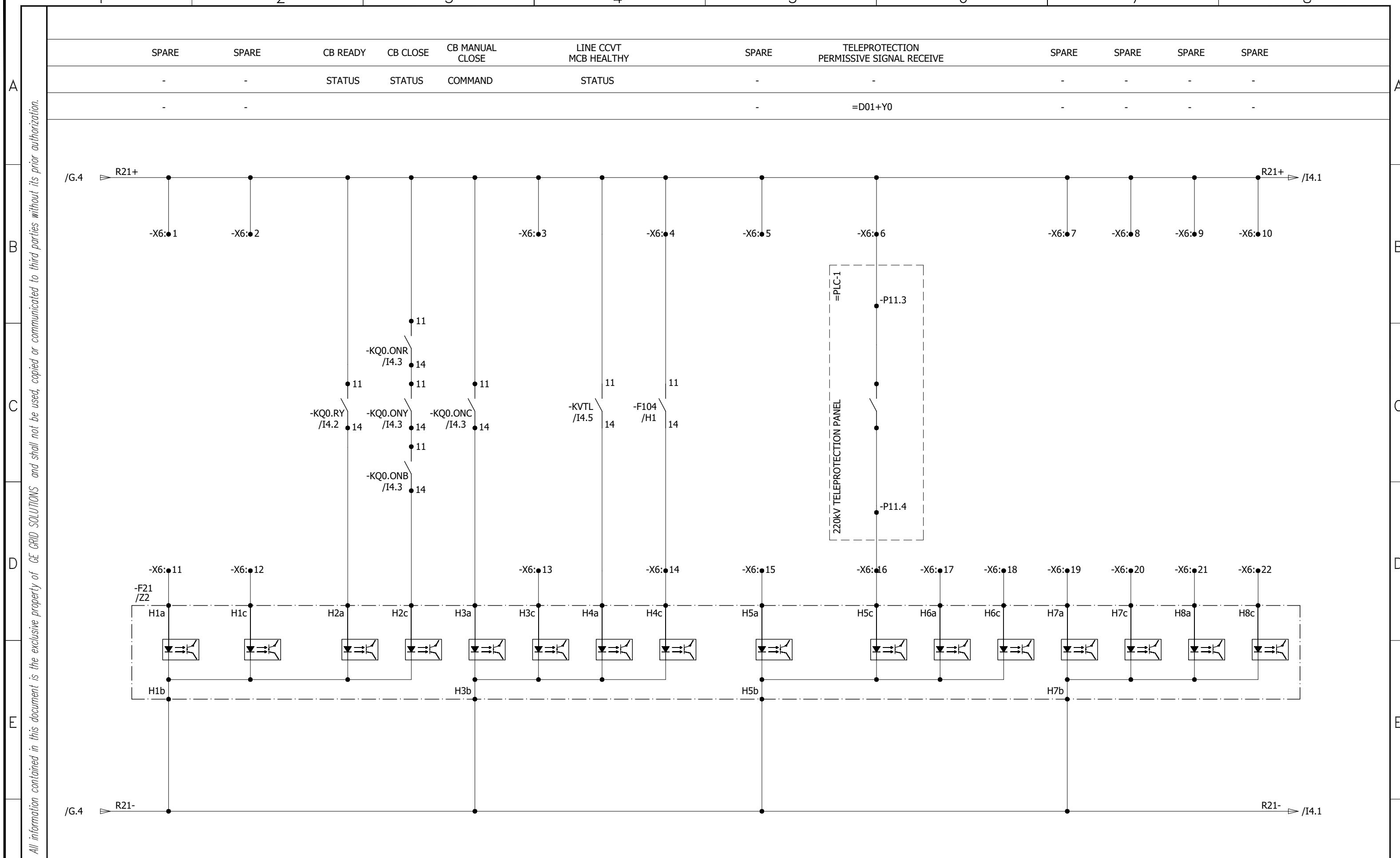
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REV.	DESCRIPTION		DATE	DRAWER	EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-2 PANEL (=D02+R2) AUTORECLOSER VT INPUTS	P-60194-E-RLC-SC-002	Project no.	Sheet type	Sheet no.
										P-60194	H2	14	

AGILE P841 AUTORECLOSER RELAY



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0	AS BUILT	20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
				 71-B Garden Block, New Garden Town, Lahore, Pakistan		NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV LINE RELAY SET-2 PANEL (=D02+R2) DISTANCE PROTECTION CT/VT CIRCUIT	P60194-E-RLC-SC-002
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type H3 Sheet no. 15

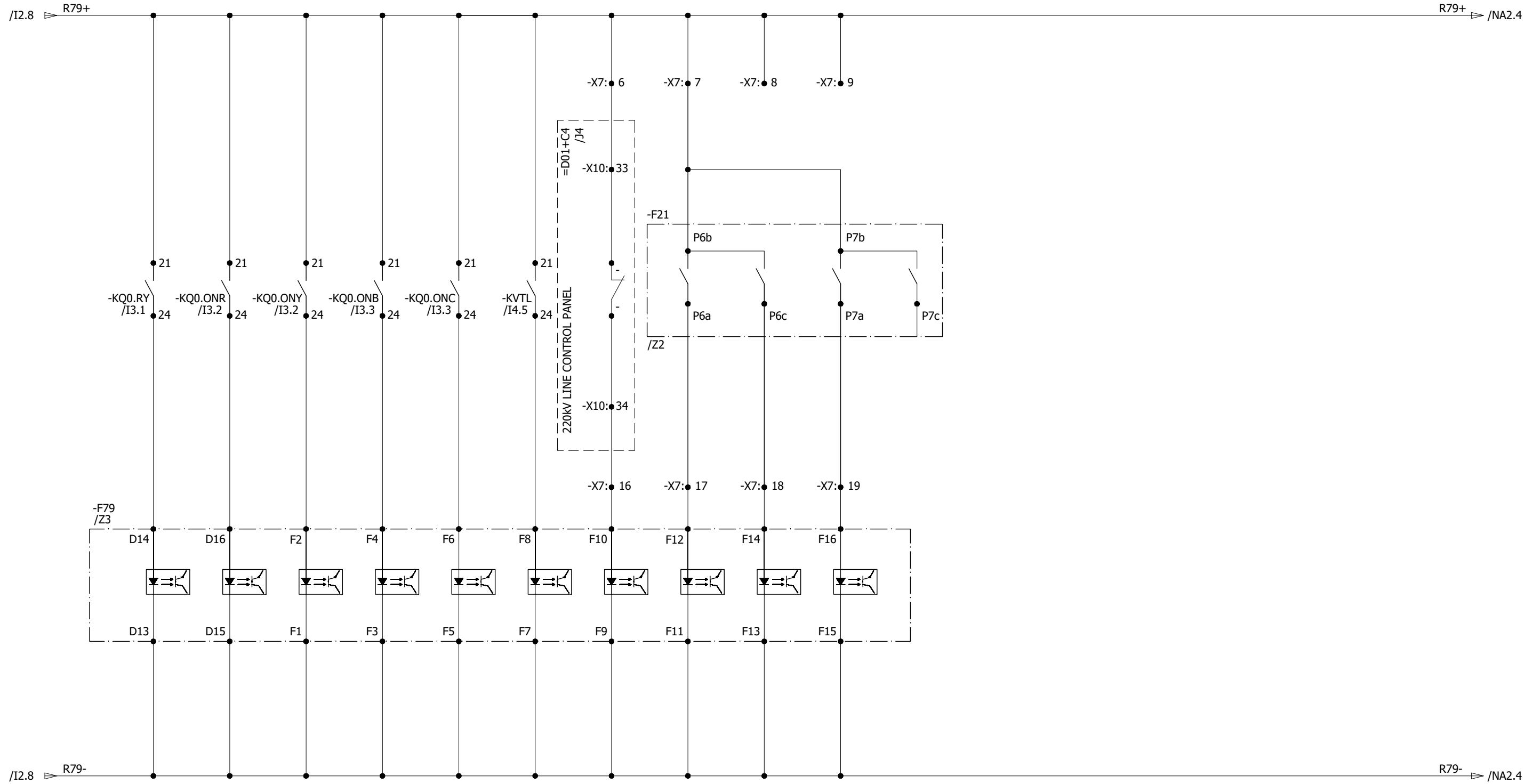


0	AS BUILT	20.11.2018	ASJ	Manufacturer <b>EPESEL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV LINE RELAY SET-2 PANEL (=D02+R2) DISTANCE RELAY INPUTS	Drawing no. P60194-E-RLC-SC-002
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type I1
									Sheet no. 16



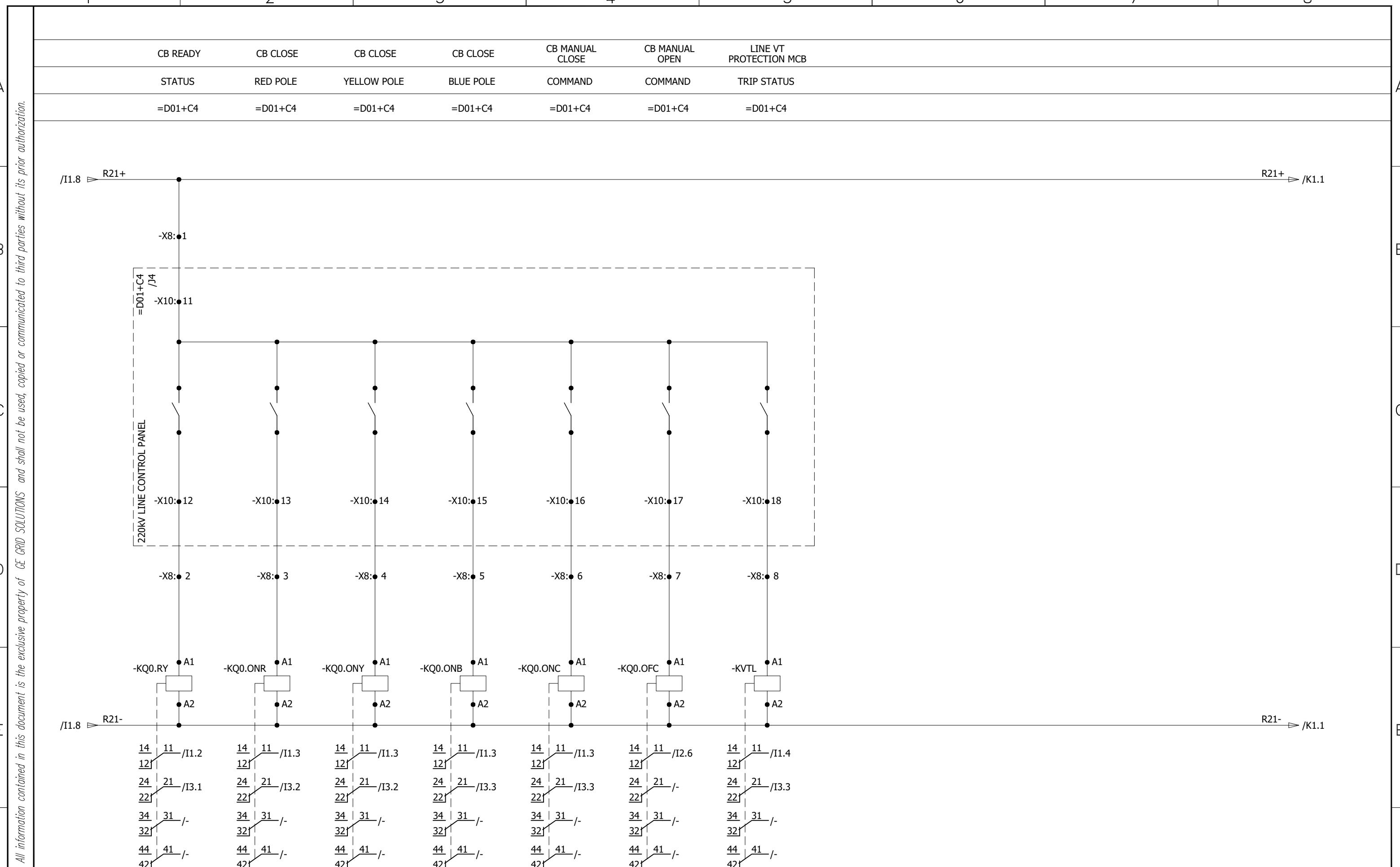
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	CB READY	CB CLOSE	CB CLOSE	CB CLOSE	CB MANUAL CLOSE	LINE CCVT MCB HEALTHY	BUSBAR VT MCB HEALTHY	DISTANCE ZONE-1		
A	STATUS	RED POLE	YELLOW POLE	BLUE POLE	COMMAND	STATUS	STATUS	R-PHASE	Y-PHASE	B-PHASE
					=D01+C4	TRIP	TRIP	TRIP		



0	AS BUILT		20.11.2018	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	220KV LINE RELAY SET-2 PANEL (=D02+R2) AUTO RECLOSE INPUTS	P-60194-E-RLC-SC-002	Project no.	Sheet type	Sheet no.
										P-60194	I3	18	

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0	AS BUILT		20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
REV.	DESCRIPTION		DATE	DRAWER	EPESEL 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		P60194-E-RLC-SC-002		
								(=D02+R2) SYSTEM INPUTS		Project no. P-60194	Sheet type I4	Sheet no. 19
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## DISTANCE PROTECTION GENERAL TRIPS

RED-PH

YELLOW-PH

BLUE-PH

## PERMISSIVE INTERTRIP

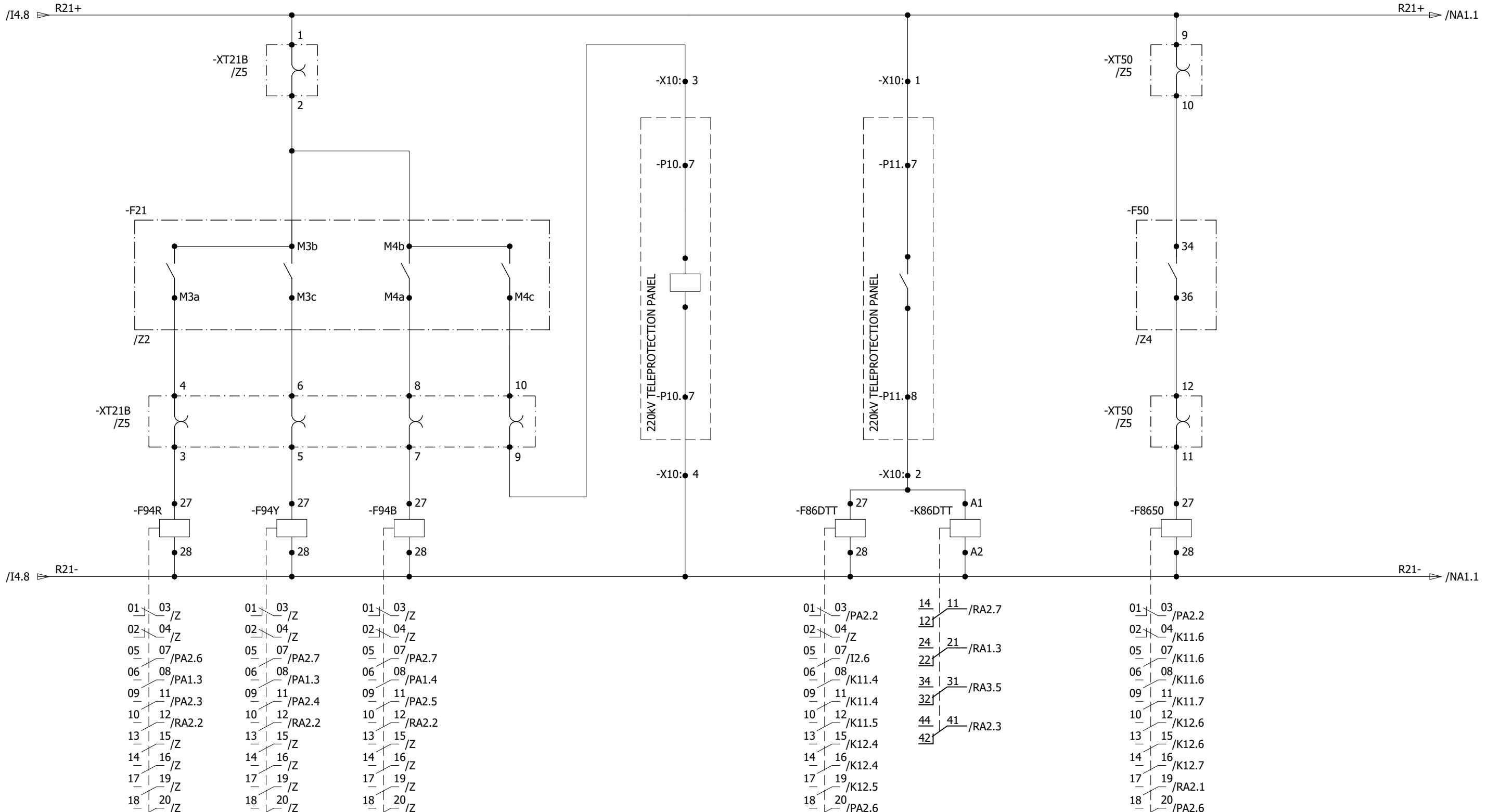
SENT

 $=D01+Y01$ 

## DIRECT TRANSFER TRIP

RECEIVED

## OVERCURRENT EARTHFAULT TRIP

 $=D01+Y01$ 

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A

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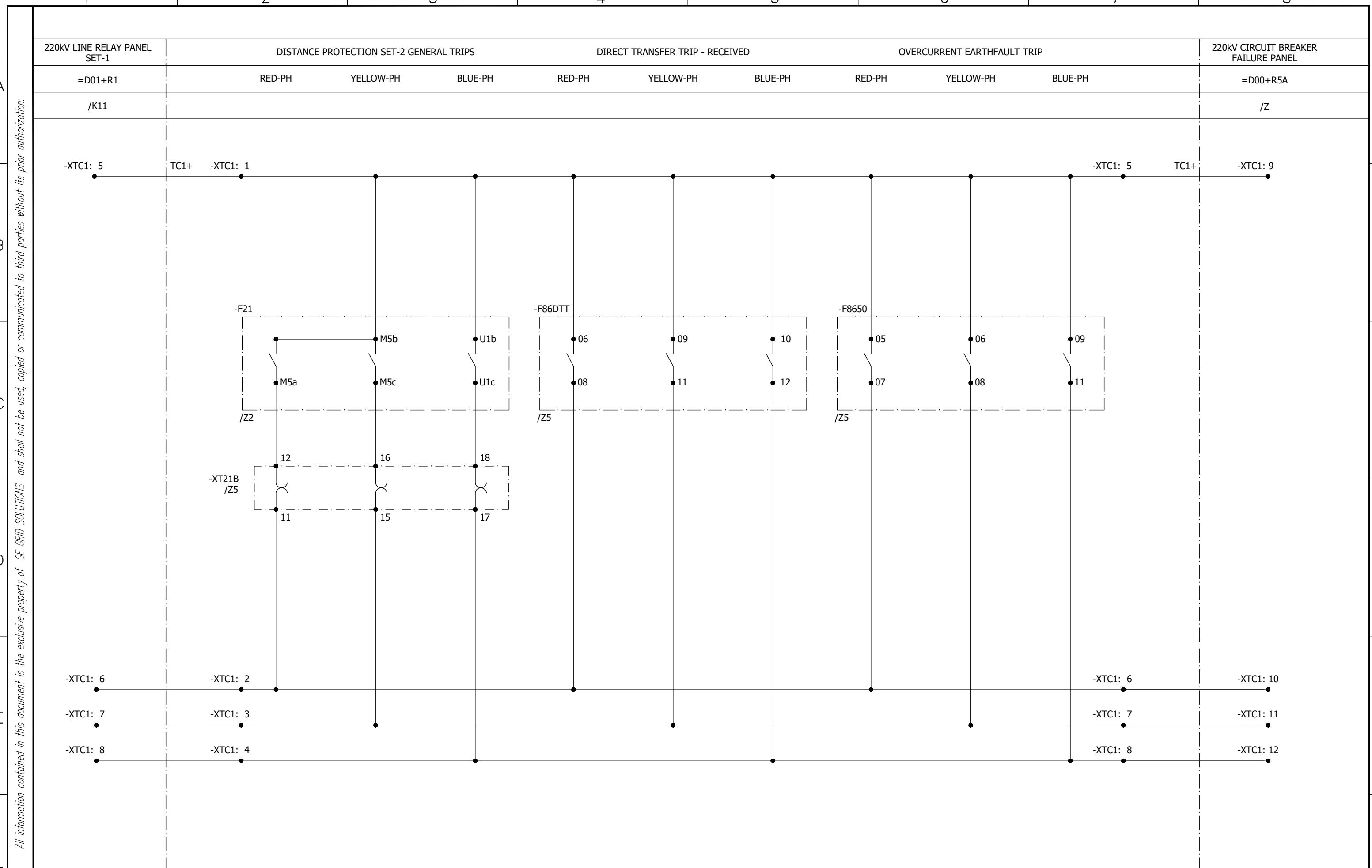
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E

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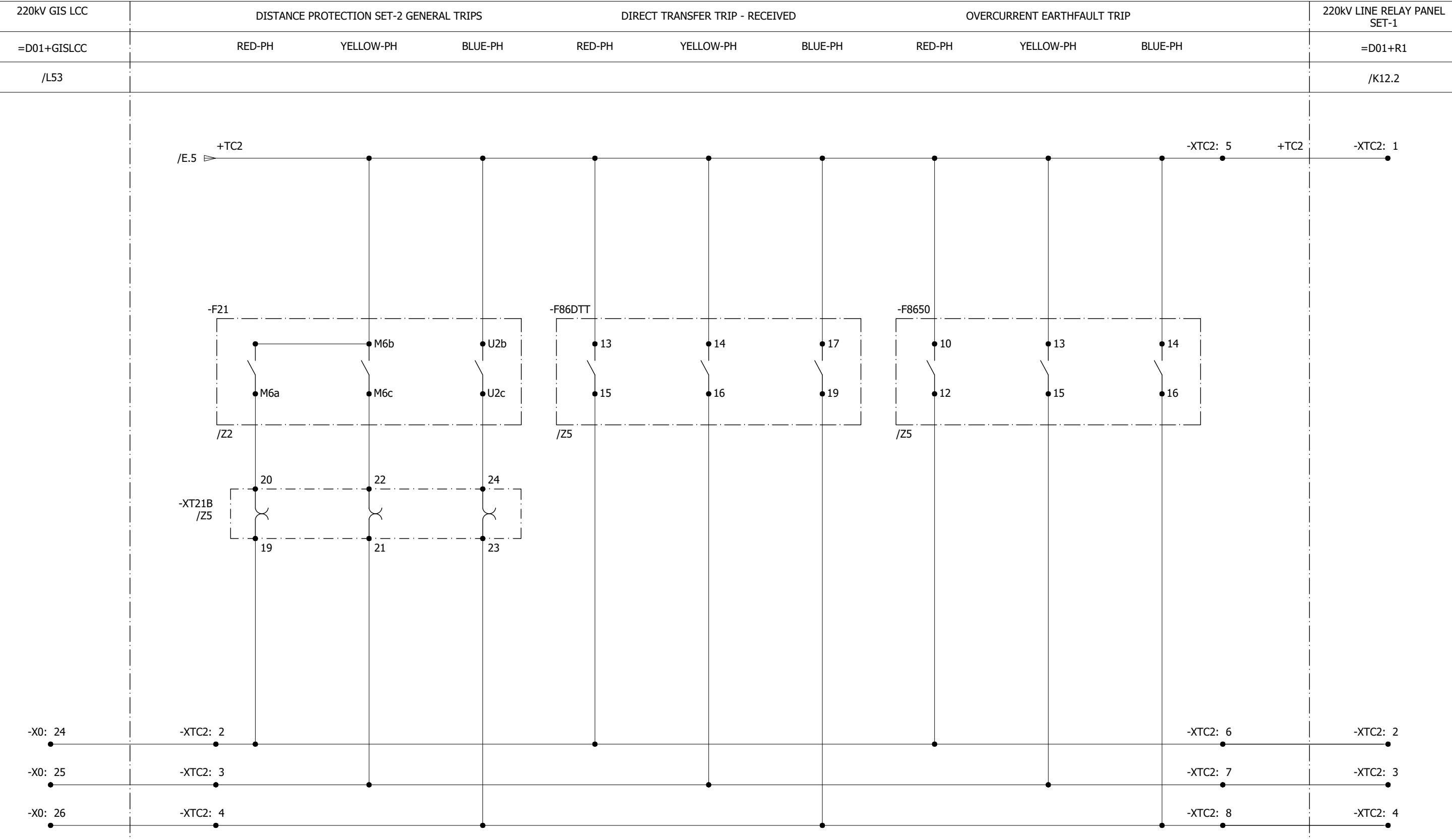
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0	AS BUILT	20.11.2018	ASJ	Manufacturer <b>EPEPSOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV LINE RELAY SET-2 PANEL (=D02+R2) PROTECTION TRIPS	Drawing no. P60194-E-RLC-SC-002
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K1
									Sheet no. 20



0	AS BUILT		20.11.2018	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	220KV LINE RELAY SET-2 PANEL (=D02+R2) TRIP CIRCUIT FOR COIL - 1	P-60194-E-RLC-SC-002	Project no.	Sheet type	Sheet no.
										P-60194	K11	21	
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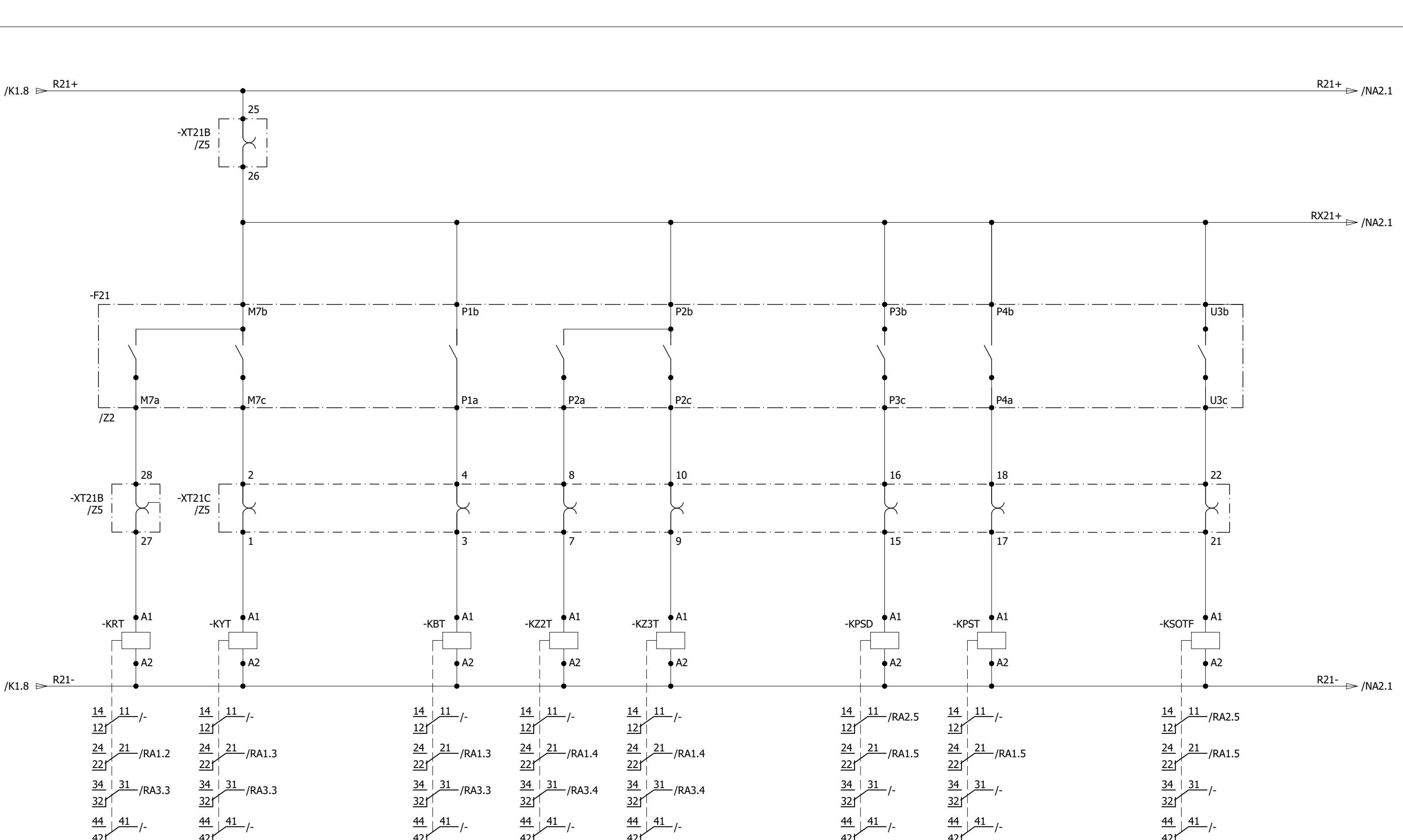
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0	AS BUILT		20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.			
REV.	DESCRIPTION		DATE	DRAWER	EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-2 PANEL (=D02+R2) TRIP CIRCUIT FOR COIL - 2	P-60194-E-RLC-SC-002	Project no.	Sheet type	Sheet no.
										P-60194	K12	22	

## DISTANCE PROTECTION SET-2 ALARMS

RED-PH TRIP	YELLOW-PH TRIP	BLUE-PH TRIP	ZONE-2 TRIP	ZONE-3 TRIP	POWER SWING DETECT	POWER SWING TRIP	SWITCH ON TO FAULT TRIP
-------------	----------------	--------------	-------------	-------------	--------------------	------------------	-------------------------



0	AS BUILT	20.11.2018	ASJ	Manufacturer  71-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 220kV LINE RELAY SET-2 PANEL (=D02+R2) SYSTEM ALARMS	Drawing no. P60194-E-RLC-SC-002		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type NA1	Sheet no. 23
1	2	3	4	5	6	7	8				

## DISTANCE PROTECTION SET-2 ALARMS

R21+ DC SUPPLY  
MONITORING

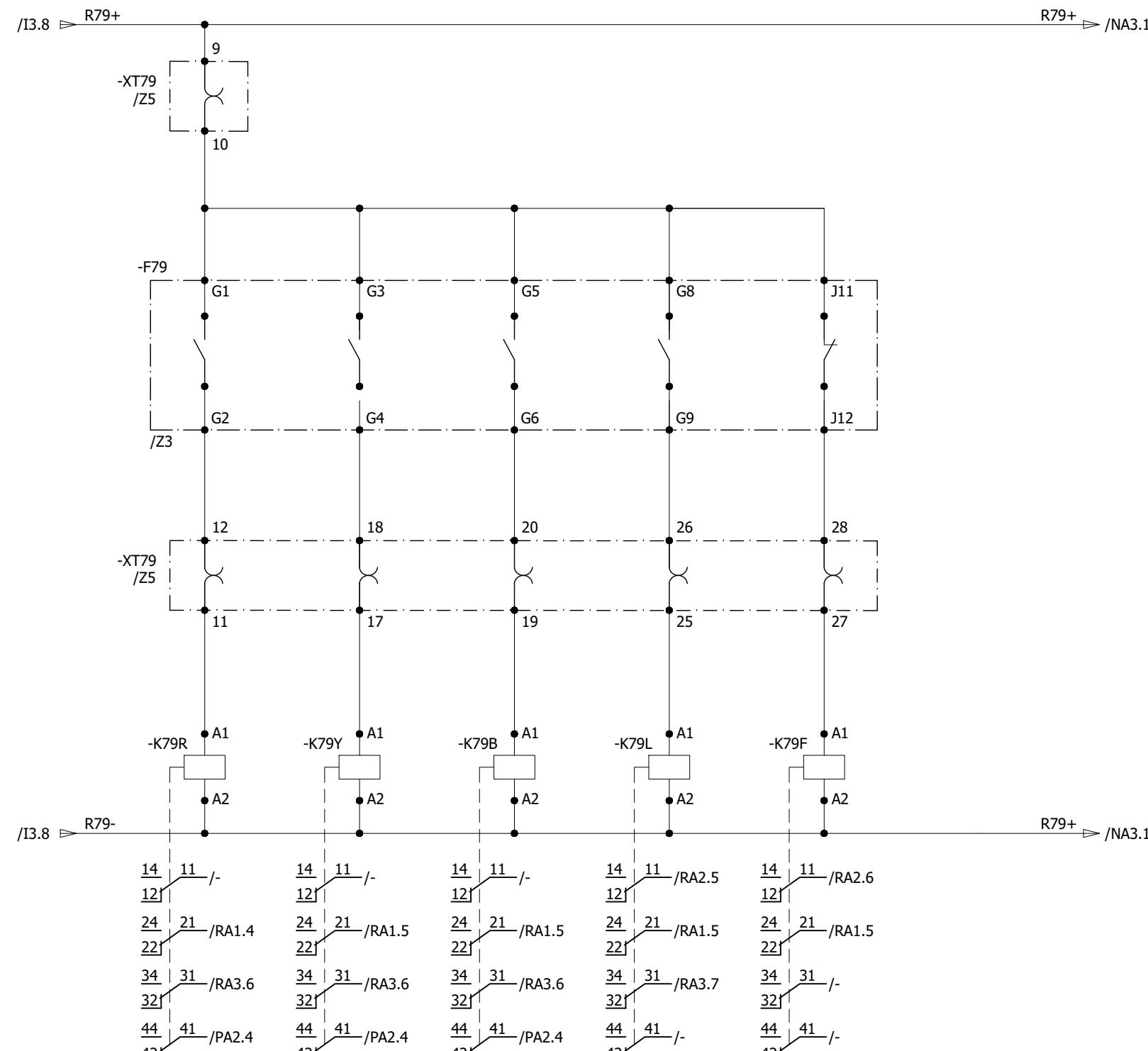
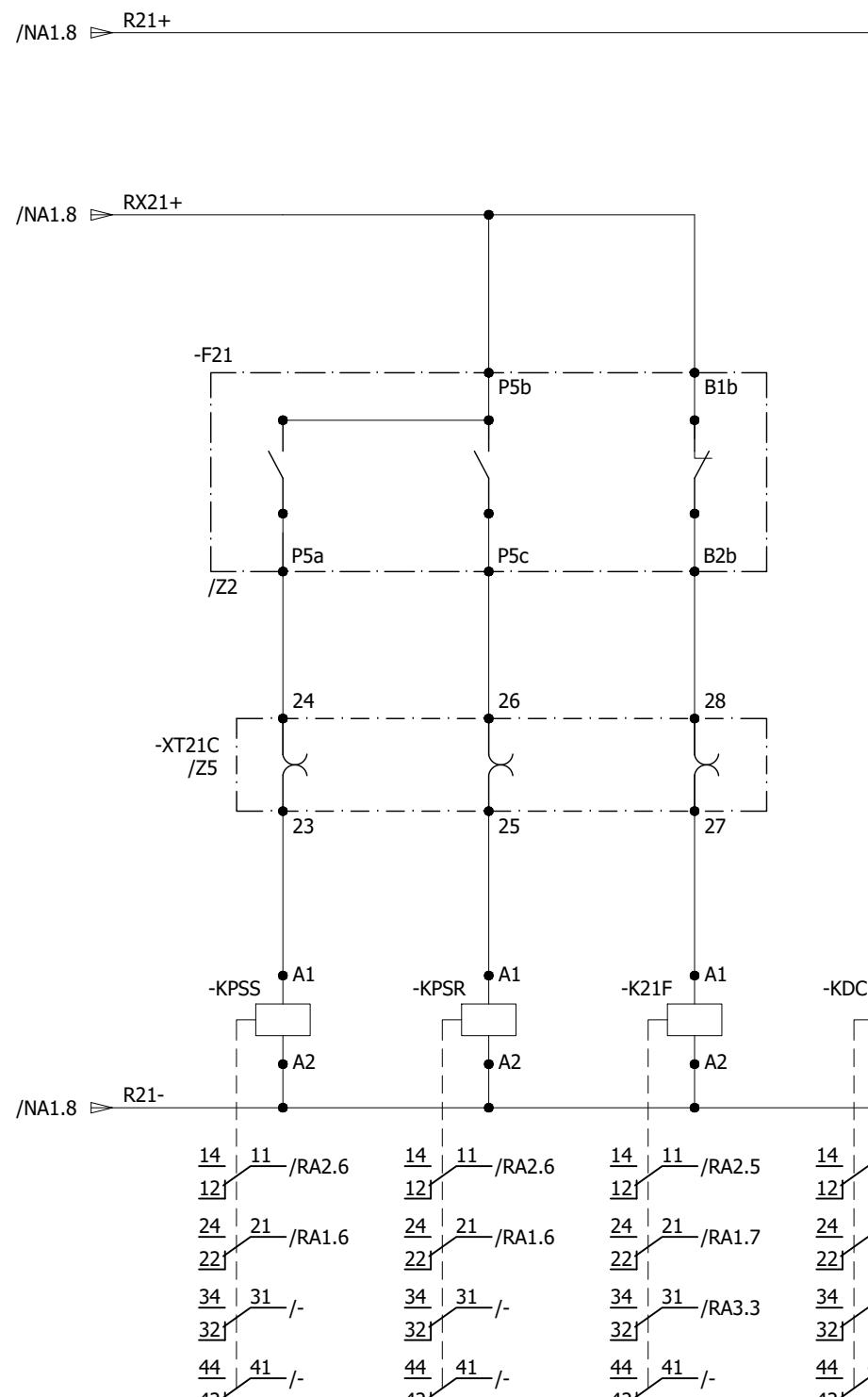
## AUTORECLOSER SET-2 ALARMS

PERMISSIVE INTER  
TRIP SENTPERMISSIVE INTER  
TRIP RECEIVEDPROTECTION  
FAULTY

+KDC1

RED-POLE  
RECLOSINGYELLOW-POLE  
RECLOSINGBLUE-POLE  
RECLOSINGAUTORECLOSER  
LOCKED OUTPROTECTION  
FAULTY

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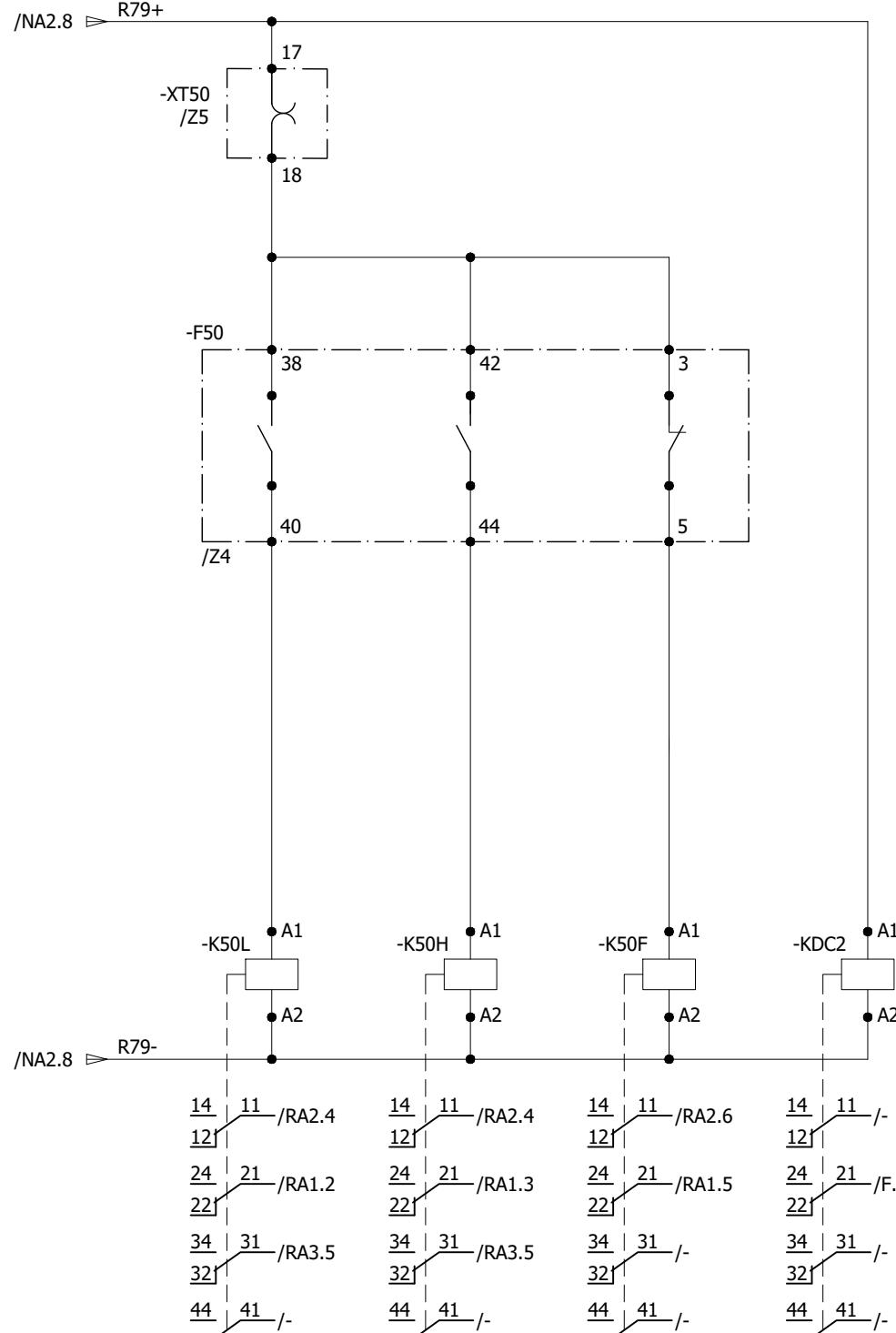
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type NA2
									Sheet no. 24

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OVERCURRENT EARTHFAULT ALARMS R79+ DC SUPPLY MONITORING

LOW-SET TRIP HIGH-SET TRIP PROTECTION FAULTY

+KDC2



A  
B  
C  
D  
E  
F

A  
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D  
E  
F

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 220KV LINE RELAY SET-2 PANEL (=D02+R2) SYSTEM ALARMS	Drawing no. P60194-E-RLC-SC-002	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type NA3	Sheet no. 25

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A

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A

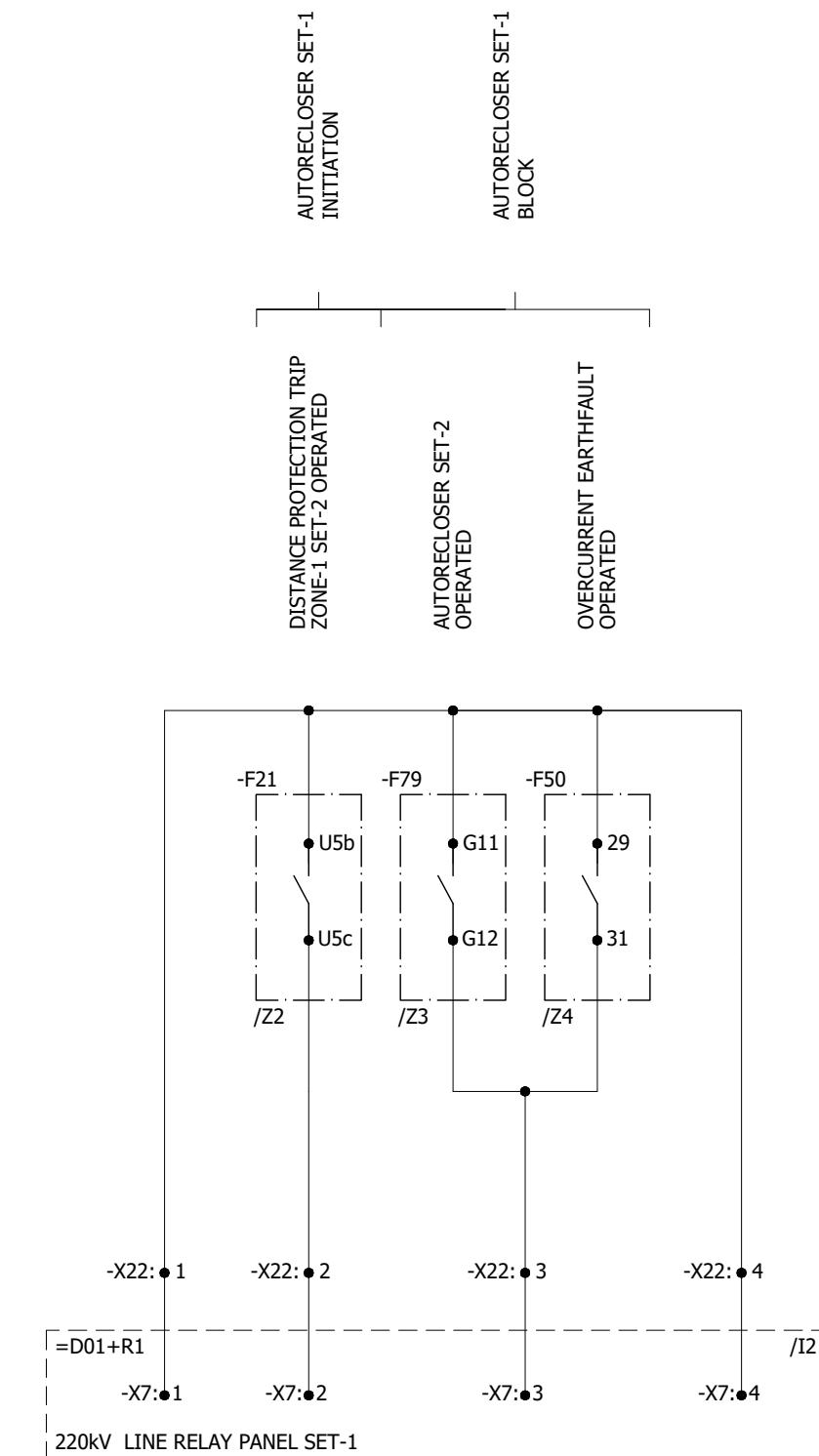
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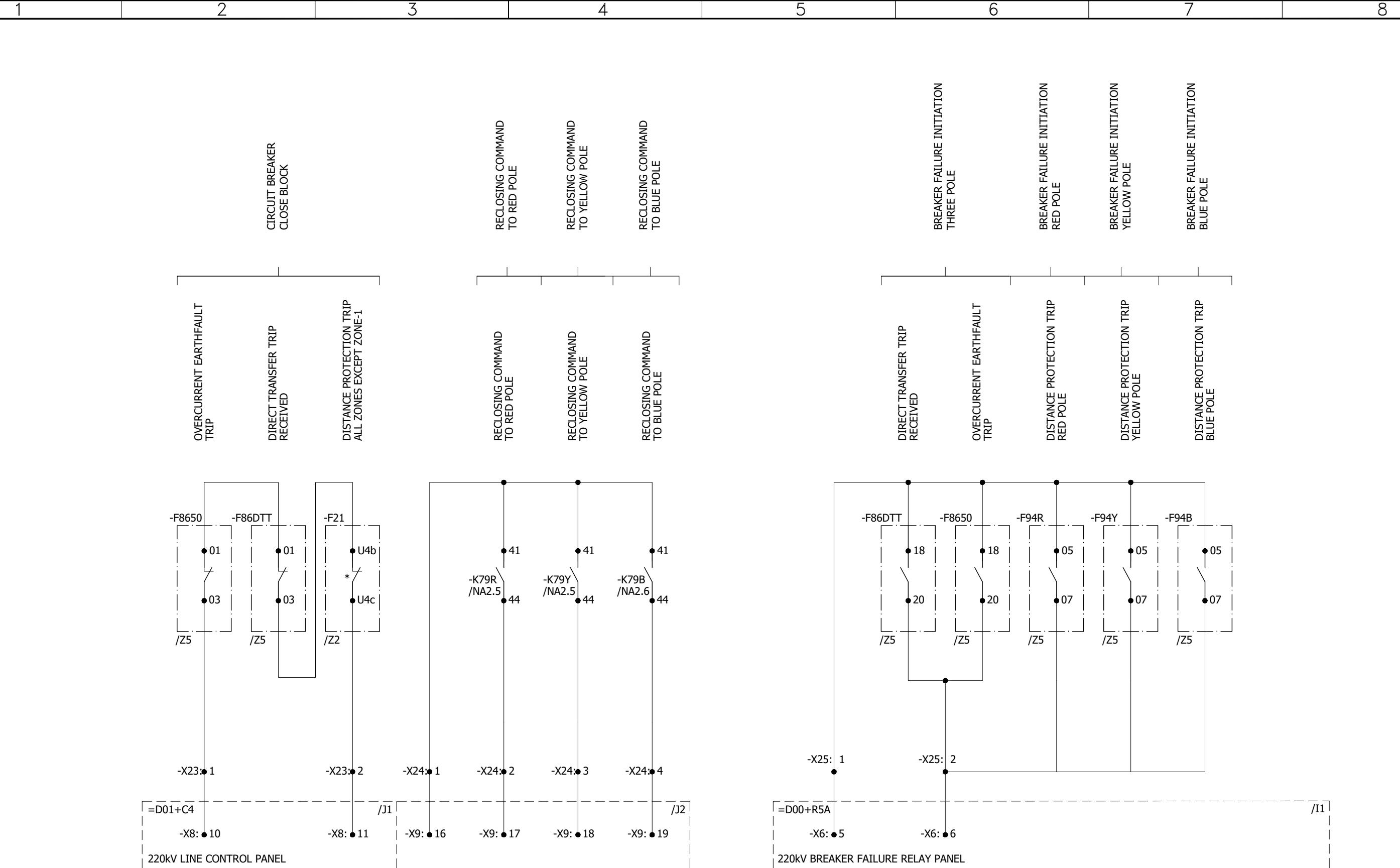


AUTORECLOSER SET-1 INITIATION

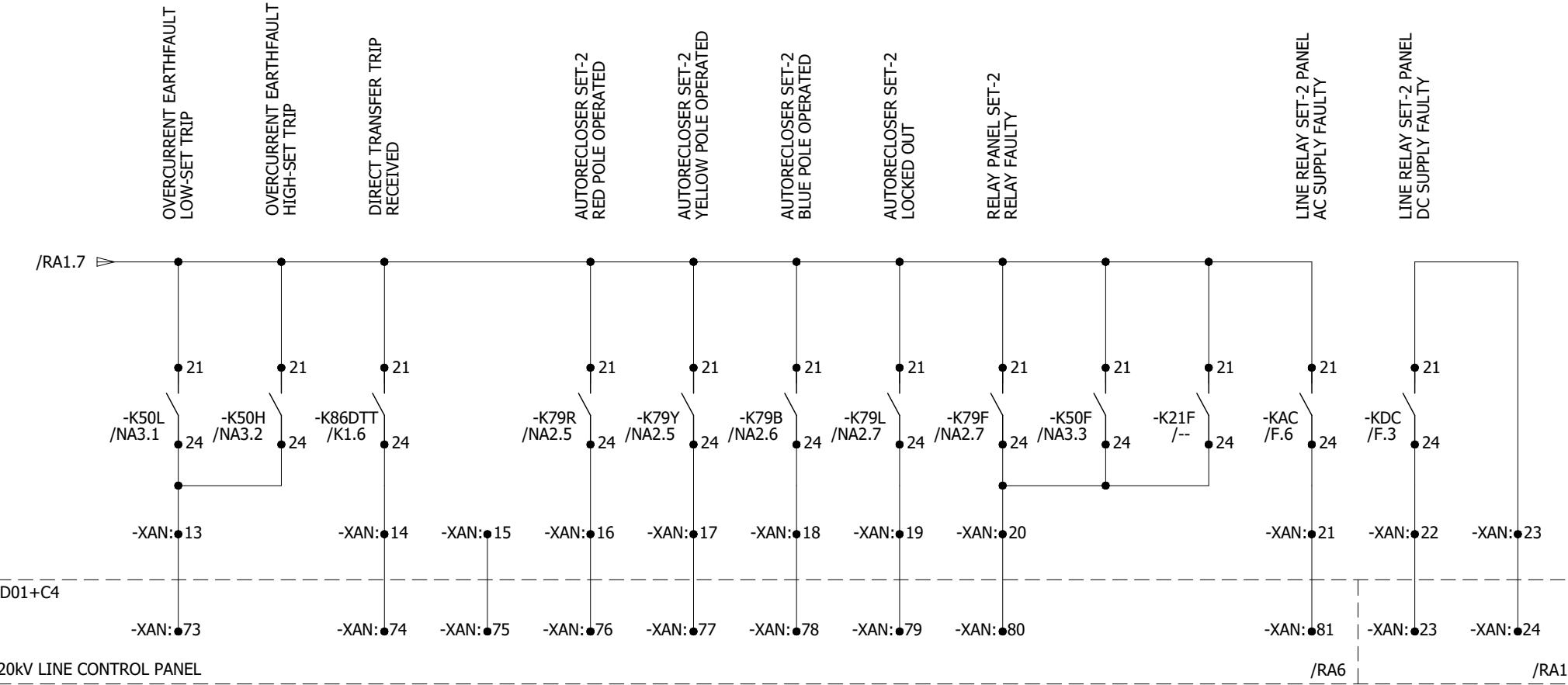
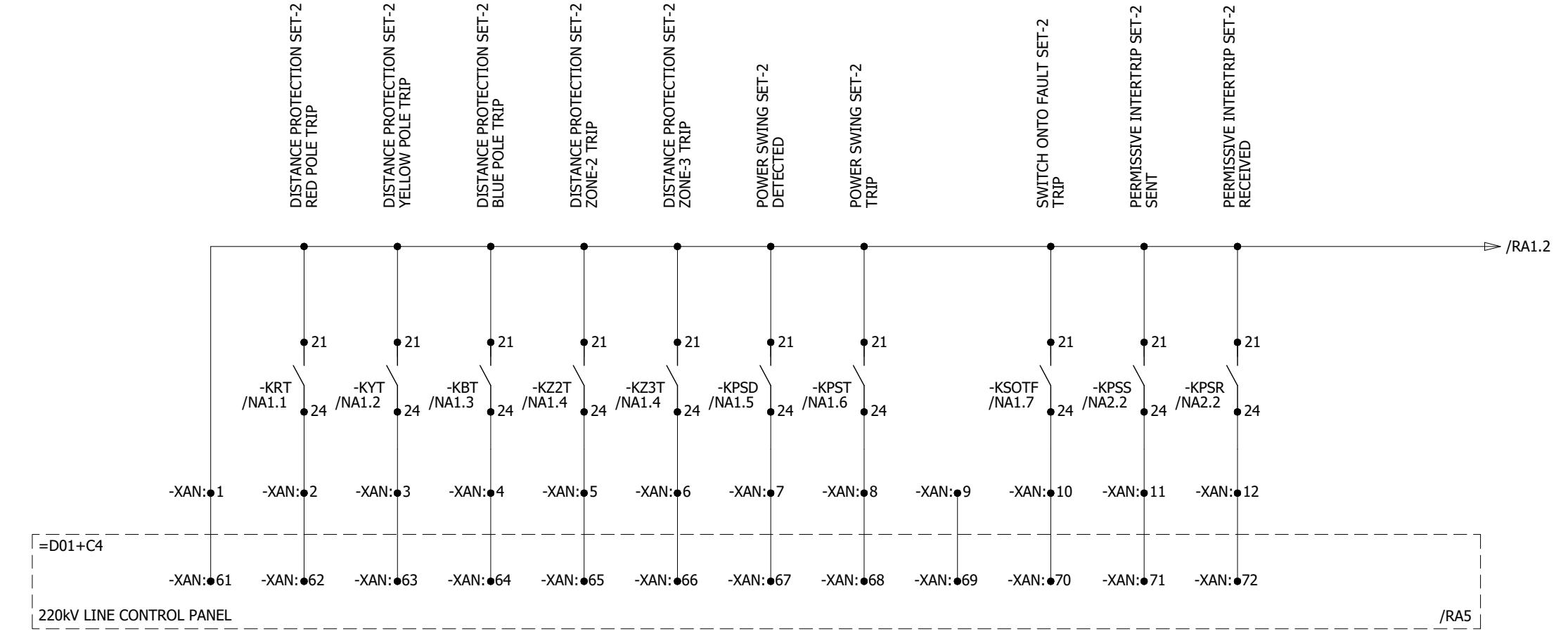
AUTORECLOSER SET-1 BLOCK

DISTANCE PROTECTION TRIP  
ZONE-1 SET-2 OPERATEDAUTORECLOSER SET-2  
OPERATEDOVERCURRENT EARTHFAULT  
OPERATED

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 220kV LINE RELAY SET-2 PANEL (=D02+R2) PROTECTION INTER-CIRCUITS	Drawing no. P60194-E-RLC-SC-002	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type PA1	Sheet no. 26

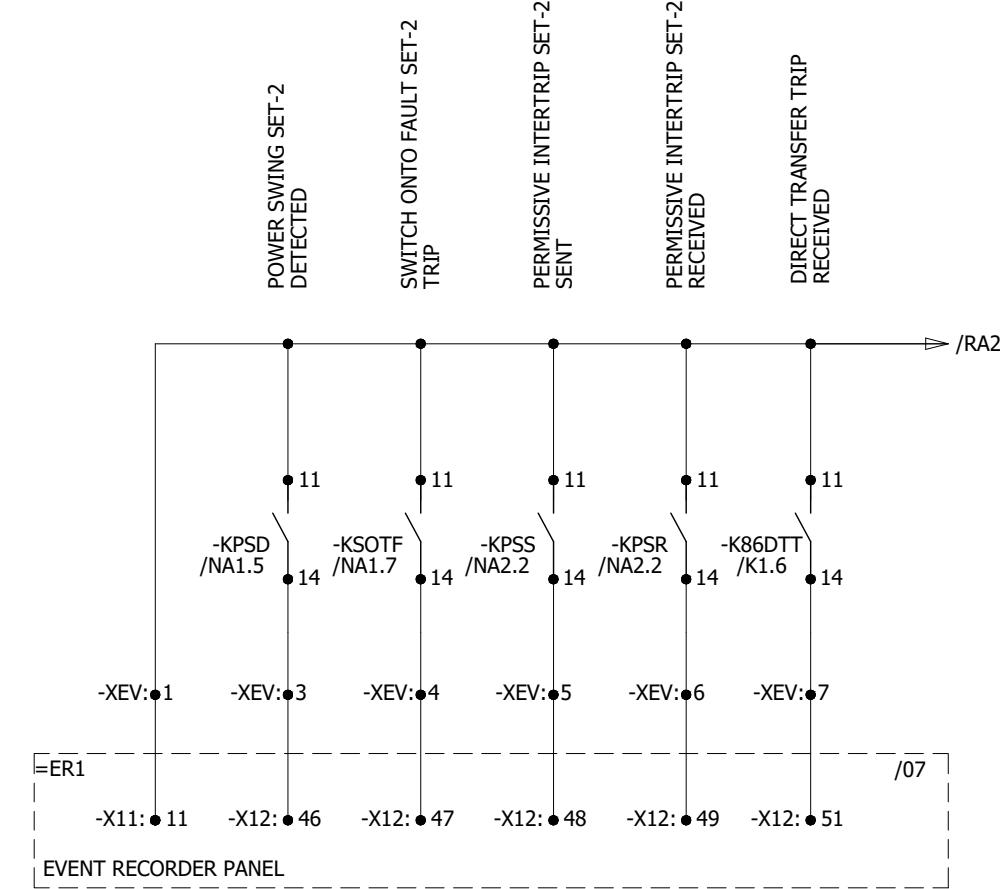
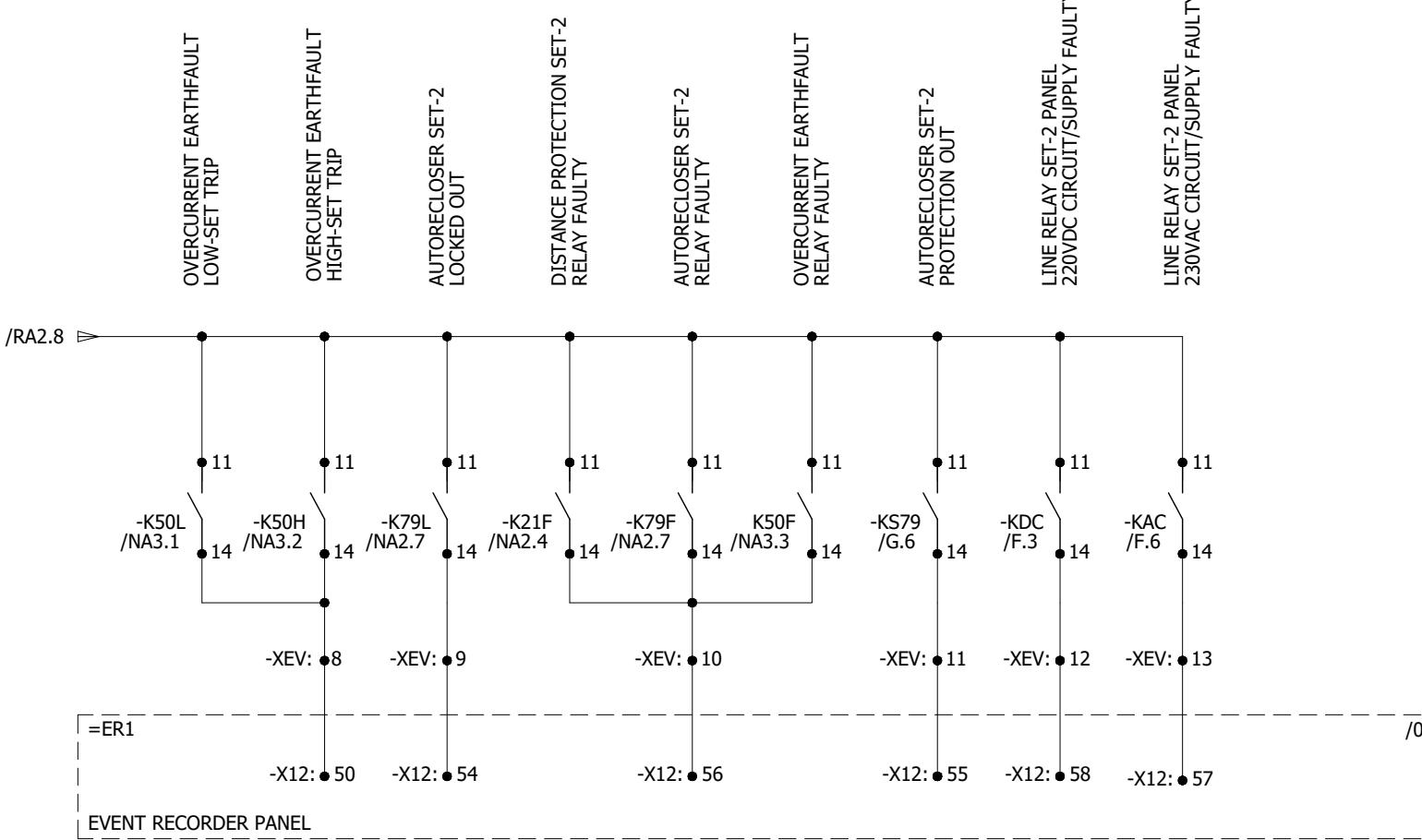
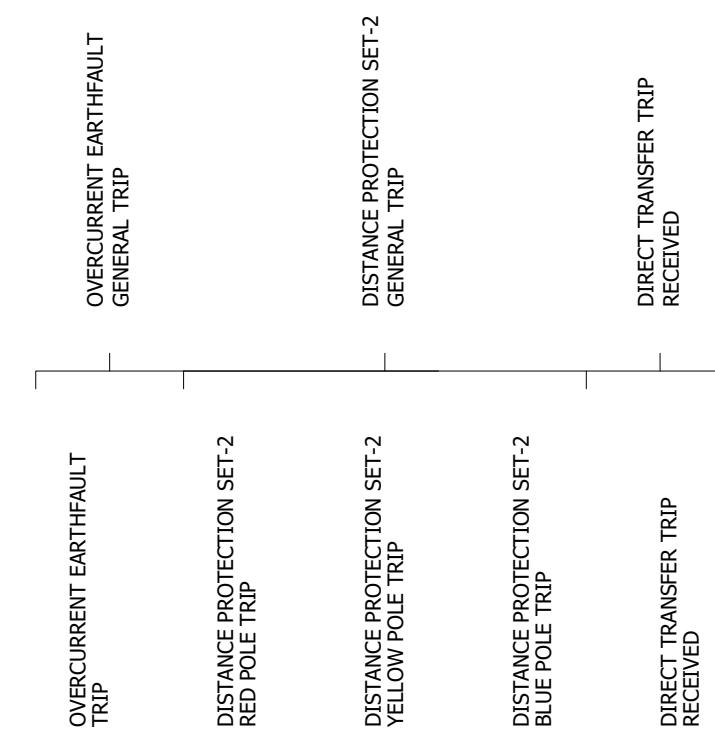
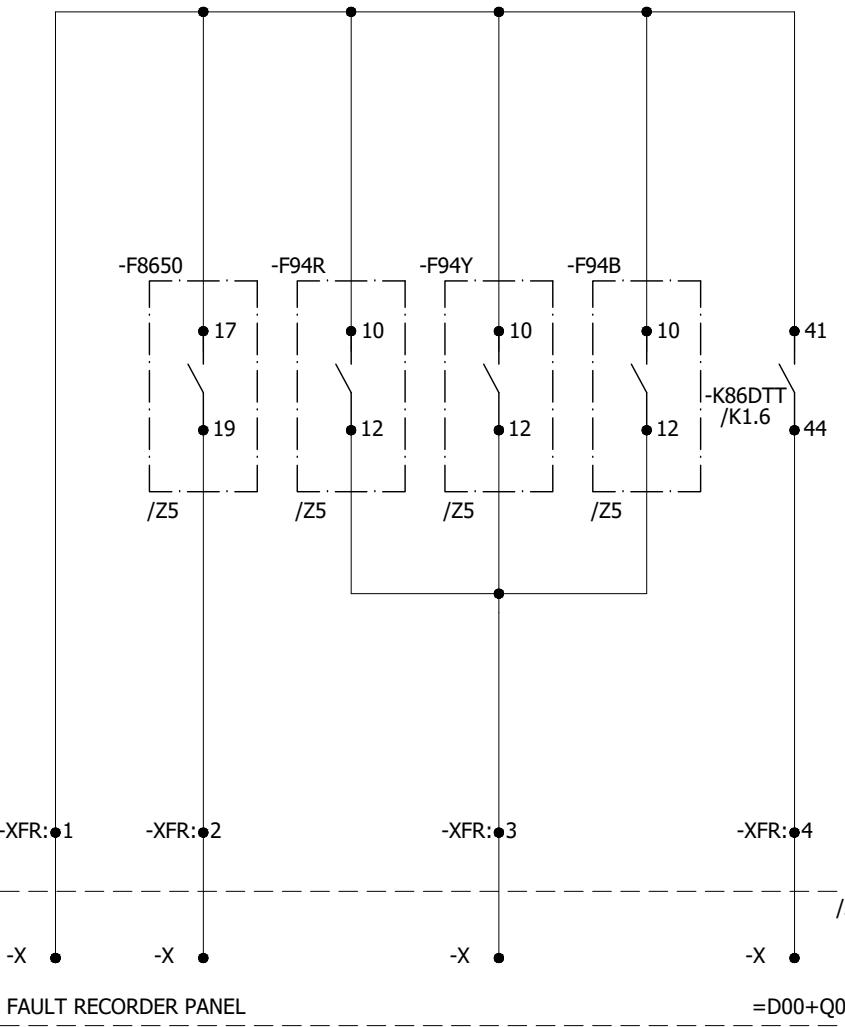


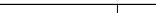
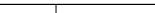
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194



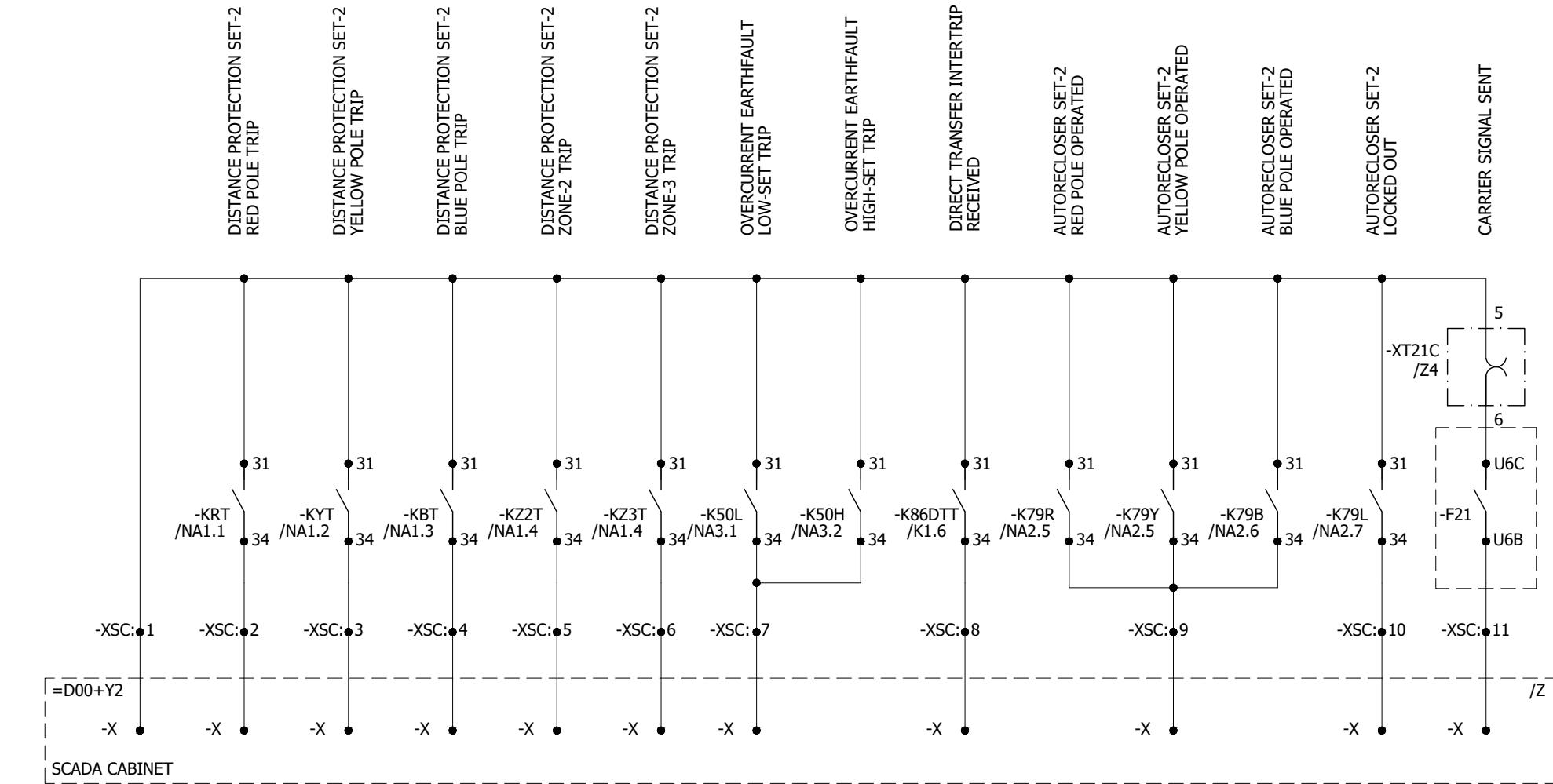
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REV.	DESCRIPTION	DATE	DRAWER	EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-2 PANEL (=D02+R2) ANNUNCIATION CIRCUIT	P60194-E-RLC-SC-002
									Project no. P-60194 Sheet type RA1 Sheet no. 28

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0	AS BUILT	20.11.2018	ASJ	<b>Manufacturer</b>  <b>EPESOL</b> <i>71-B Garden Block, New Garden Town, Lahore, Pakistan</i>	<b>Contractor</b>  <b>Grid Solutions</b> <small>A GE and Alstom joint venture</small>	<b>Client</b>  <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED</b> <small>(NTDC-WAPDA)</small>	<b>Project</b> <b>220kV/132kV GIS SUBSTATION</b> <b>GAZI ROAD, LAHORE</b>	<b>Title</b> <b>220kV LINE RELAY SET-2 PANEL</b> <small>(=D02+R2)</small> <b>EVENT &amp; FAULT RECORDER CIRCUITS</b>	<b>Drawing no.</b>		
								<b>P60194-E-RLC-SC-002</b>			
								<b>Project no.</b>			
								<b>P-60194</b>	<b>Sheet type</b>	<b>Sheet no.</b>	
REV.	DESCRIPTION	DATE	DRAWER						RA2	29	

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A

A

B

B

C

C

D

D

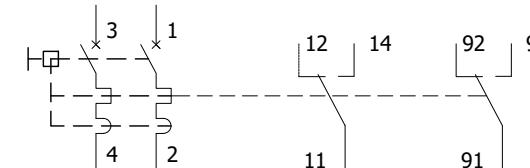
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E

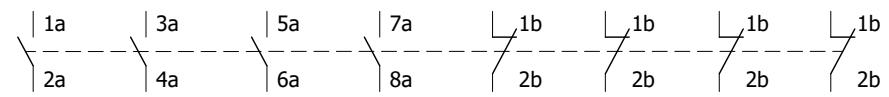
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F

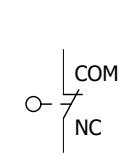
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194      Sheet type RA3      Sheet no. 30



-F101	D.2	F.6	
-F102	D.4	F.6	
-F103	D.6	F.6	
-F201	E.2	F.2	
-F202	E.3	F.2	
-F203	E.4	F.2	
-F204	E.5	F.3	



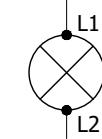
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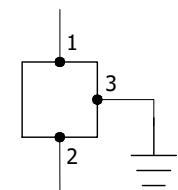
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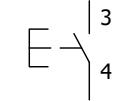
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-H200	F.4



-R100	D.5
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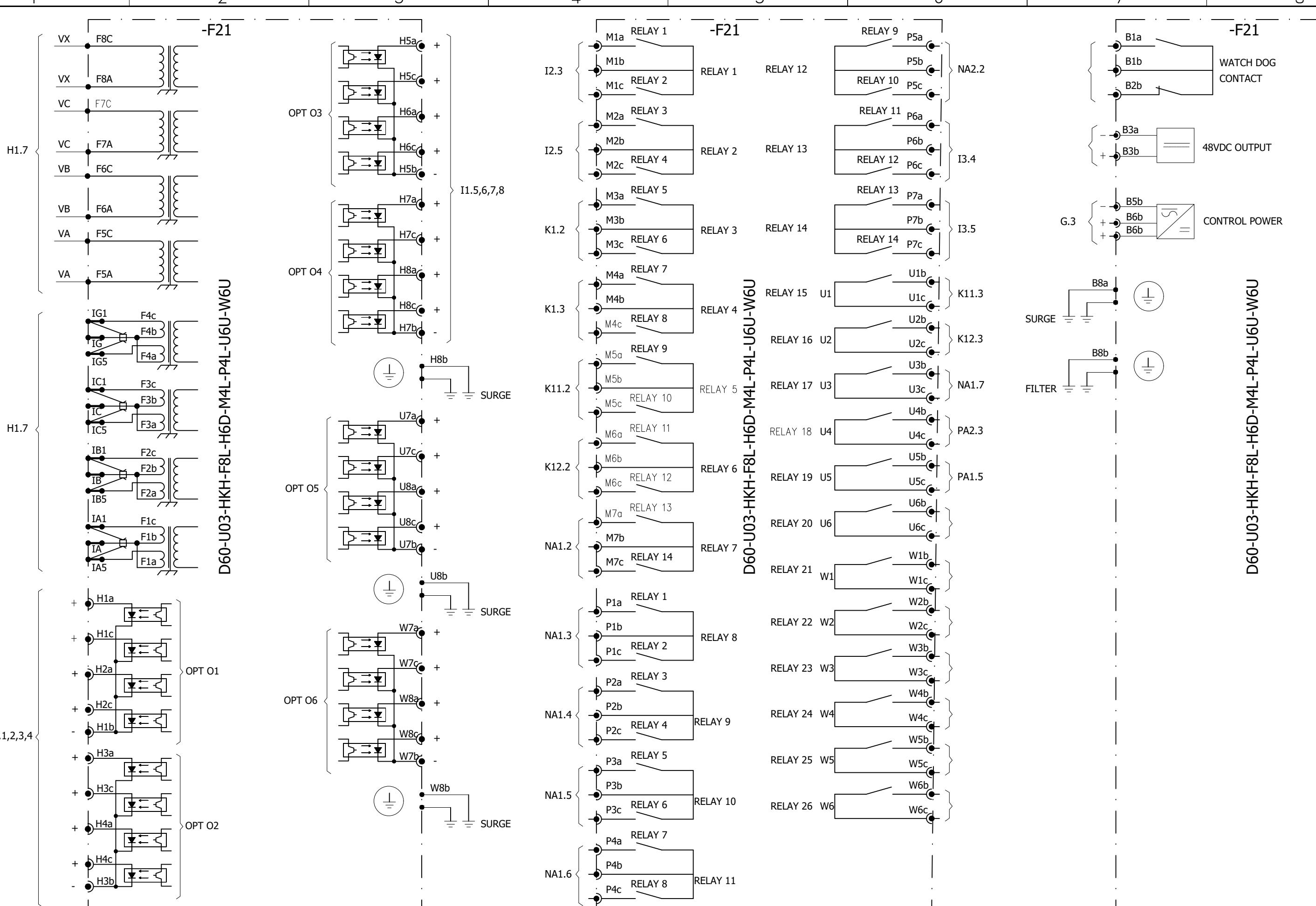
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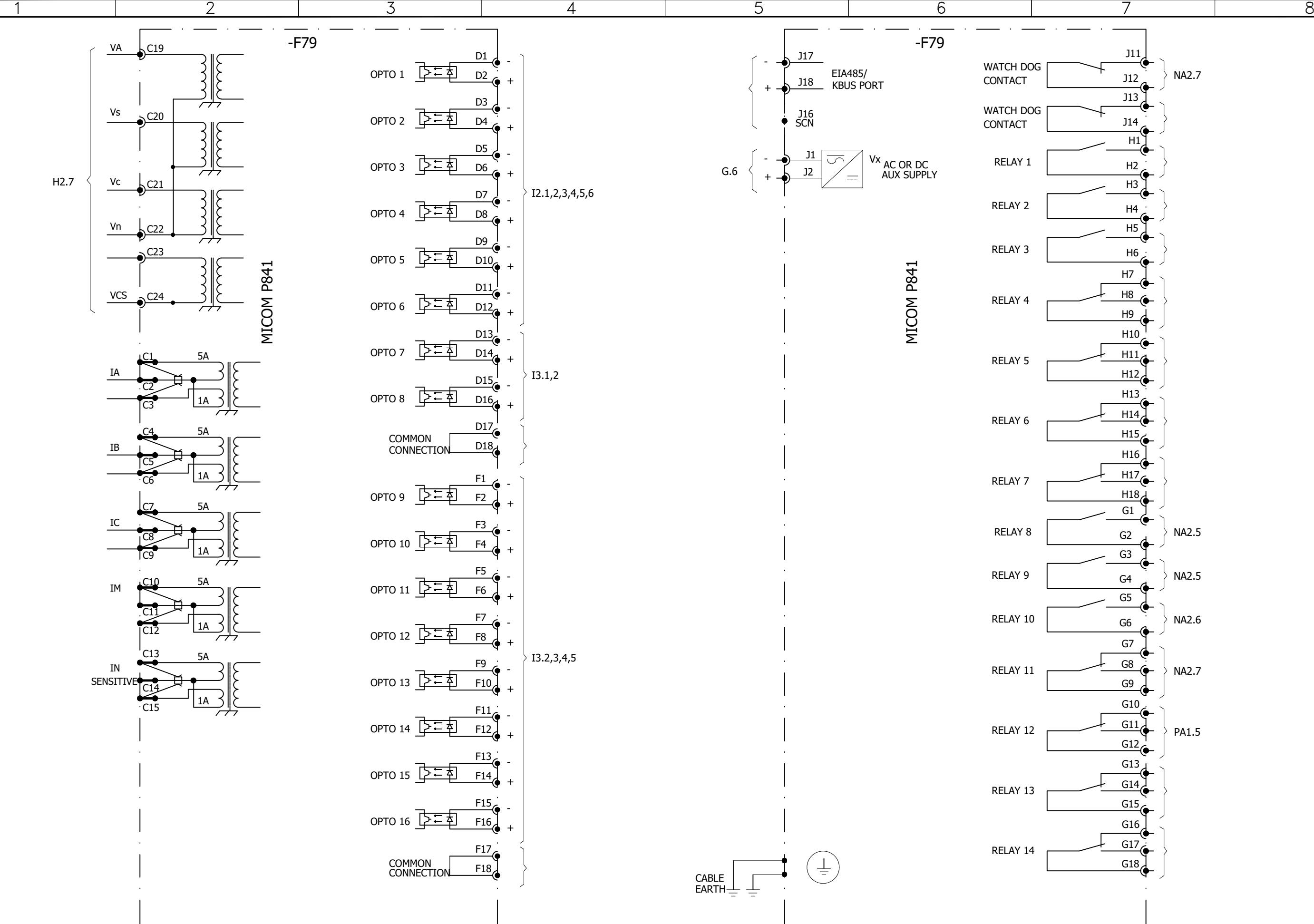
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0	AS BUILT	20.11.2018	ASJ	Manufacturer  71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV LINE RELAY SET-2 PANEL (=D02+R2) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-002		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z1	Sheet no. 31
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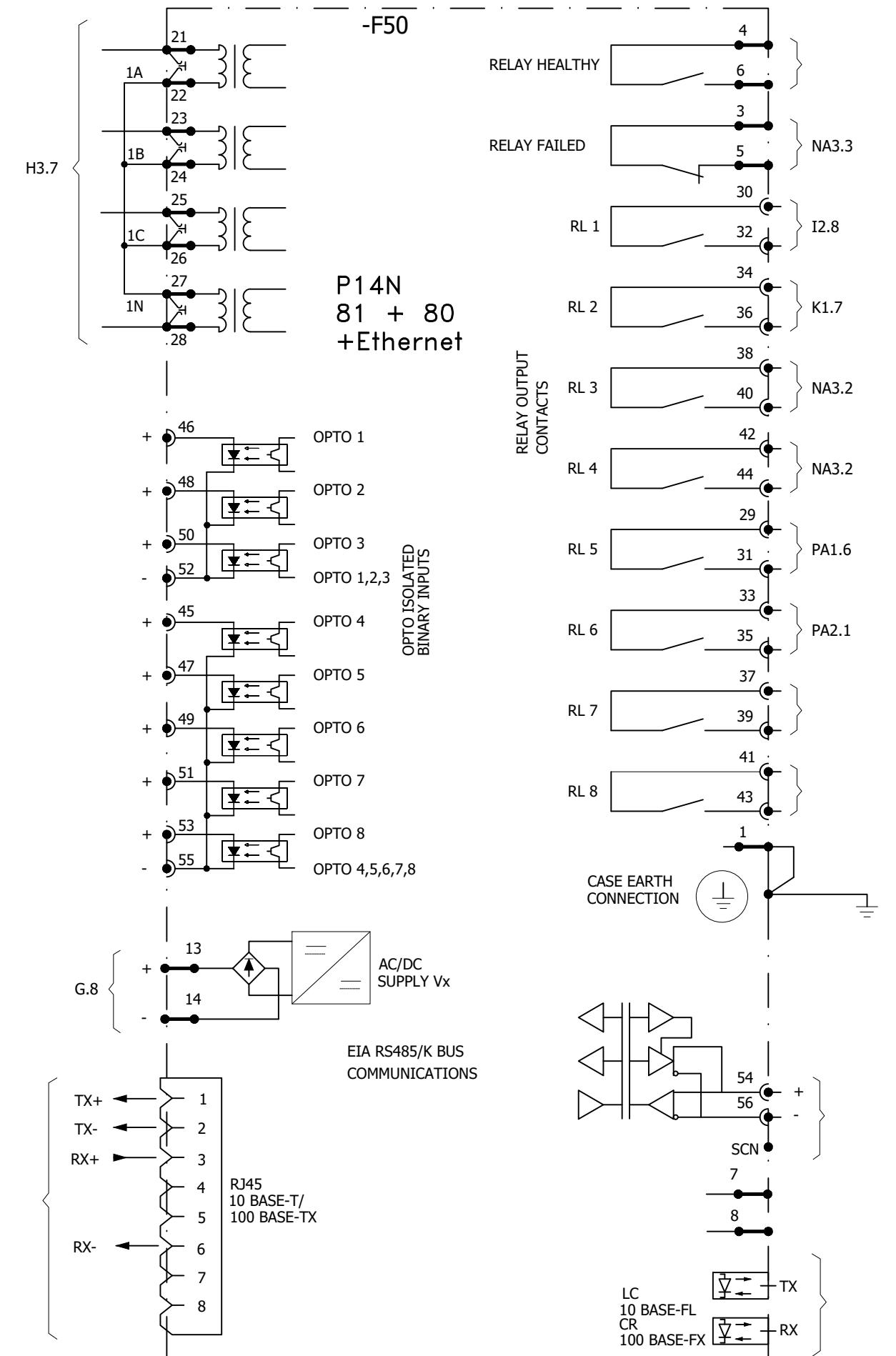


0	AS BUILT	20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPESOL 21-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-2 PANEL (=D02+R2) COMPONENT DIAGRAM	P60194-E-RLC-SC-002
									Project no. P-60194 Sheet type Z2 Sheet no. 32

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0	AS BUILT	20.11.2018	ASJ	Manufacturer <b>EPESEL</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 220kV LINE RELAY SET-2 PANEL (=D02+R2) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-002		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z3	Sheet no. 33



0	AS BUILT	20.11.2018	ASJ	Manufacturer  71-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 220KV LINE RELAY SET-2 PANEL (=D02+R2) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-002		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z4	Sheet no. 34

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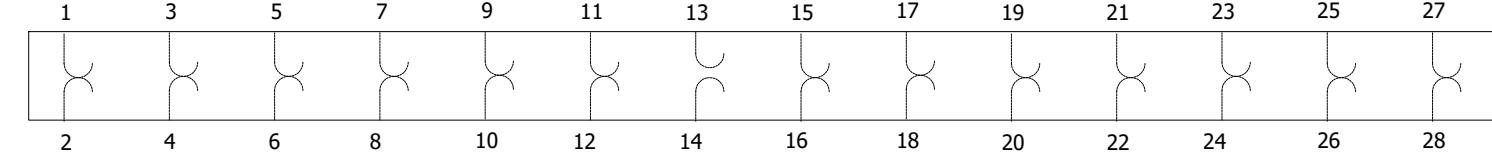
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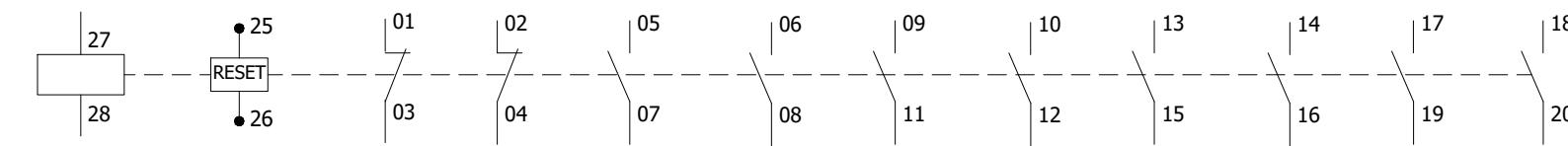
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-XT21A	H1.5				G.3	H1.5			
-XT21B	K1.2			K11.2		K12.2		NA1.2	
-XT21C	NA1.2,3		RA3.7	NA1.4		NA1.6		NA1.7	NA2.2,3
-XT50	H3.5			K1.7		G.8	NA3.2	H3.5	
-XT79	H2.5			NA2.5		G.6	NA2.6		H2.5
								NA2.7	



-F94R	K1.2				PA2.6	PA1.3	PA2.3	RA2.2			
-F94Y	K1.2				PA2.7	PA1.3	PA2.4	RA2.2			
-F94B	K1.3				PA2.7	PA1.4	PA2.5	RA2.2			
-F86DTT	K1.5	G.2	PA2.2		I2.6	K11.4	K11.5	K12.4	K12.4	K12.5	PA2.6
-F8650	K1.7		PA2.2		K11.6	K11.6	K11.7	K12.6	K12.6	K12.7	PA1.2
											PA2.6

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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 220kV LINE RELAY SET-2 PANEL (=D02+R2) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-002
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type Z5
									Sheet no. 35

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