

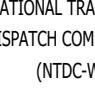


Grid Solutions
A GE and Alstom joint venture

220kV/132kV GIS SUBSTATION GHAZI ROAD , LAHORE

220kV LINE RELAY SET-1 PANEL (=D02+R1) SCHEMATIC DRAWINGS

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			
REV	DATE	DRW. BY	CHK. BY	APR. BY	REVISION DESCRIPTION			
0	20.11.2018	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								
220kV LINE RELAY SET-1 PANEL (=D02+R1) SCHEMATIC DRAWINGS								
Order no		Document no						
P-60194		P60194-E-RLC-SC-001						
Sheet type		Total sheets			Sheet no			
A		30			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	X	X				
	02	AA	List Of Contents			X	X	X	X	X	X				
	03	AB	Symbols and Legends			X	X	X	X	X	X				
	04	AC	Component List			X	X	X	X	X	X				
	05	AD	Panel View			X	X	X	X	X	X				
	06	AE	Bay Concept & Protection Logics			X	X	X	X	X	X				
	07	D	AC Supply Distribution Circuit			X	X	X	X	X	X				
	08	E	DC Supply Distribution Circuit			X	X	X	X	X	X				
	09	F	AC/DC Supply Failure Circuits			X	X	X	X	X	X				
	10	G	Relay Control & Supply Circuits			X	X	X	X	X	X				
	11	H1	Distance Relay Protection CT/VT Circuit			X	X	X	X	X	X				
	12	H2	Autorecloser VT Input Circuit			X	X	X	X	X	X				
	13	I1	Distance Relay input Circuit			X	X	X	X	X	X				
	14	I2	Auto Recloser Input Circuit			X	X	X	X	X	X				
	15	I3	Auto Recloser Input Circuit			X	X	X	X	X	X				
	16	I4	System Input Circuit			X	X	X	X	X	X				
	17	K1	Protection Trips Circuit			X	X	X	X	X	X				
	18	K2	Trip Circuit for Coil-1			X	X	X	X	X	X				
	19	K3	Trip Circuit for Coil-2			X	X	X	X	X	X				
	20	NA1	System Alarm Circuits			X	X	X	X	X	X				
	21	NA2	System Alarm Circuits			X	X	X	X	X	X				
	22	PA1	Protection Circuits			X	X	X	X	X	X				
	23	PA2	Protection Circuits			X	X	X	X	X	X				
	24	RA1	CP Annunciation Circuit			X	X	X	X	X	X				
	25	RA2	Event & Fault Recorder Circuit			X	X	X	X	X	X				
	26	RA3	SCADA Circuit			X	X	X	X	X	X				
	27	Z1	Component Diagram			X	X	X	X	X	X				
	28	Z2	Component Diagram			X	X	X	X	X	X				
	29	Z3	Component Diagram			X	X	X	X	X	X				
	30	Z4	Component Diagram			X	X	X	X	X	X				
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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-1 PANEL (=D02+R1) LIST OF CONTENTS	Drawing no. P60194-E-RLC-SC-001					
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		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

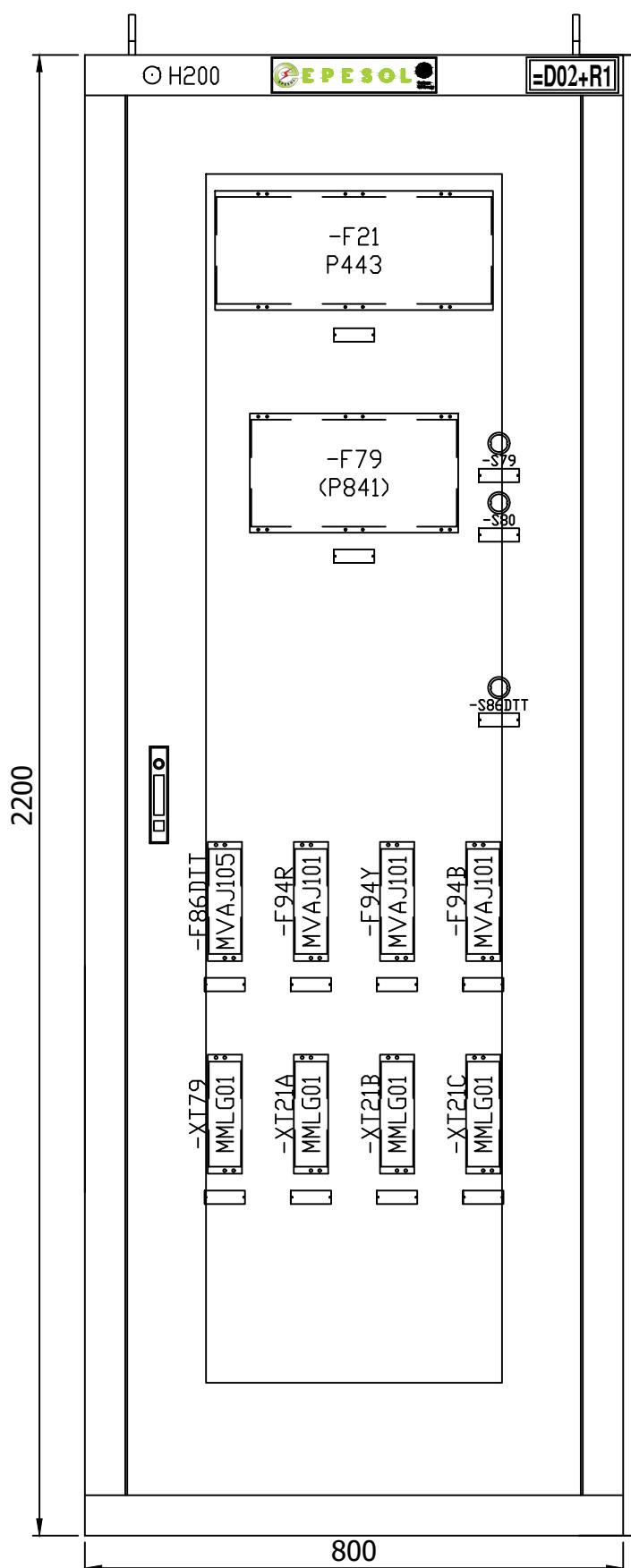
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AB
									Sheet no. 03

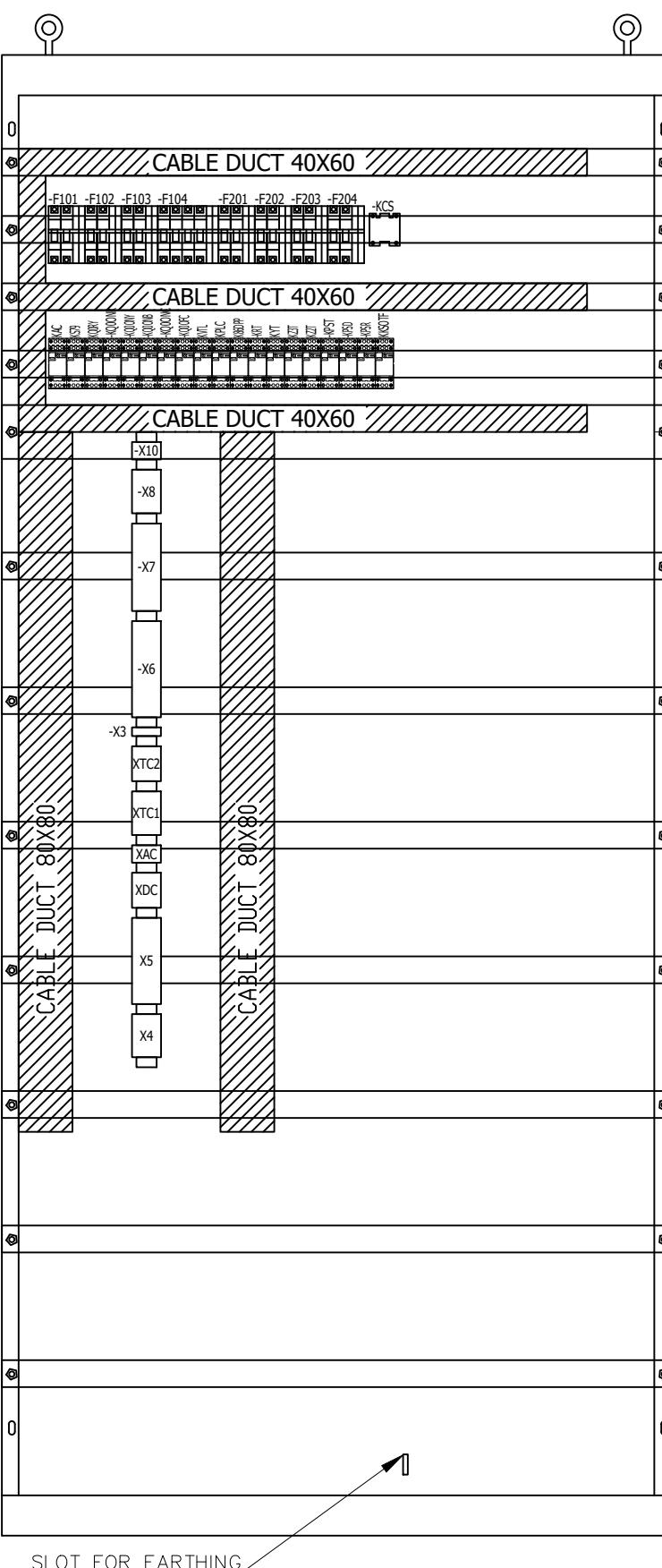
	1	2	3	4	5	6	7	8				
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER					
A	01	DISTANCE PROTECTION RELAY	AGILE P443, Cortec: P443-91BB7M0760M Supply: 110-250VDC / 100-240VAC, 4 VT + 3 CT (100-120V:1/5A) Inputs 24 Opto Inputs, 32 Relay Outputs			-F21	GE GRID SOLUTIONS					
	01	AUTO RECLOSER RELAY	AGILE P841, Cortec: P841-91BA7M0660M Supply: 110-250VDC / 100-240VAC, 4 VT + 3 CT (100-120V:1/5A) Inputs 16 Opto Inputs, 14 Relay Outputs			-F79	GE GRID SOLUTIONS					
	04	TEST BLOCK	MMLG01, Cortec: MMLG01-R1AA9002D			-XT21A-C,-XT79,-XT21B,-XT21C	GE GRID SOLUTIONS					
B	03	TRIPPING RELAY (SELF-RESETTING)	MVAJ101, Cortec: MVAJ101-RA1002A Supply: 220-250VDC, 8 NO + 2 NC Contacts			-F94R,-F94Y,-F94B	GE GRID SOLUTIONS					
	01	TRIPPING RELAY (HAND/ELECTRICAL RESET)	MVAJ105, Cortec: MVAJ105-RA1002A Supply: 220-250VDC, 8 NO + 2 NC Contacts			-F86DTT	GE GRID SOLUTIONS					
	02	CONTROL MCB - PANEL LIGHT & HEATER	G62C02+CAH(2), 2-Pole, Ratings: 2A, 230VAC, 6kA @ 230VAC, 2 CO Contacts			-F101-102	GE GRID SOLUTIONS					
C	01	CONTROL ELCB - PANEL SOCKET	DM100C16/030+CAH(2), 2-Pole, Ratings: 16A, 30mA, 230VAC, 10 kA @ 230VAC, 2 CO Contacts			-F103	GE GRID SOLUTIONS					
	04	CONTROL MCB - DC DISTRIBUTION	EP102UCC04+CAH(2), 2-Pole, Ratings: 4A, 220VDC, 10kA @ 250VDC, 2 CO Contacts			-F201-204	GE GRID SOLUTIONS					
	01	AC MCB - VT CIRCUIT	G64C02+CAH(2), 4-Pole, Ratings 2A, 240 VAC, 6KA, 2 CO Contacts			-F104	GE GRID SOLUTIONS					
D	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.					
	01	PUSHBUTTON - DIRECT TRANSFER TRIP RESET	YS-AP1-2-40-B-D-W, Push Button Black, Spring return, Ratings: 10A, 220VDC			-S86DTT	YONGSUNG ELECTRIC CO., LTD.					
E	30	AUXILIARY CONTACTOR	PRC4M40DCML, Coil Voltage: 220VDC, 4 CO Contacts			-KAC,-KS79,-KQ0.RY/ONR/ONY/OYB/ONC/OFC,-KVTL,-KPLC -K86DTT,-KRT/YT/BT/Z2T/Z3T,-KPSD/T,-KSOTF,-KPR/S, -K21F,-K79R/Y/B/L/F,KDCM,-KDC1/2	GE GRID SOLUTIONS					
	01	AUXILIARY CONTACTOR	MCRC022ATWN+MARN211AT, Coil Voltage: 220VDC, 3 NO + 3 NC Contacts			-KCS	GE GRID SOLUTIONS					
	02	AUXILIARY CONTACTOR	PRC4M40ANL, Coil Voltage: 230VAC, 4 CO Contacts			-KACM, KDC	GE GRID SOLUTIONS					
F	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.					
	01	PANEL LIGHT WITH DS	YST8-30-5W+YSP3315GW-B, 230VAC @ 50HZ, 5W, WITH DOOR LIMIT SWITCH			-S100,-H100	YONGSUNG ELECTRIC CO., LTD.					
	01	THREE PIN SOCKET	1N+PE, 16A, 230VAC @ 50Hz			-X100	LEAR					
G	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					
	4	TERMINAL BLOCK FOR AC SUPPLY DISTRIBUTION	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XAC	CABUR					
H	8	TERMINAL BLOCK FOR DC SUPPLY DISTRIBUTION	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XDC	CABUR					
	8	TERMINAL BLOCK FOR CT CIRCUIT	SCB-6, Screw Type, Feed Through Terminal			-X4	CABUR					
	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 220KV LINE RELAY SET-1 PANEL (=D02+R1) COMPONENT LIST	Drawing no. P60194-E-RLC-SC-001		
REV.	DESCRIPTION		DATE	DRAWER						Project no. P-60194	Sheet type AC	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	20	TERMINAL BLOCK FOR VT CIRCUIT	SCB-6, SCREW TYPE, FEED THROUGH TERMINAL			-X5	CABUR			
	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			
B	20	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X7	CABUR			
	11	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X8	CABUR			
	5	TERMINAL BLOCK FOR CONTROL CIRCUIT	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X10	CABUR			
C	11	TERMINAL BLOCK FOR TRIP CIRCUIT 1	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XTC1	CABUR			
	9	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			
D	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			
	7	TERMINAL BLOCK FOR BFI	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-X25	CABUR			
E	25	TERMINAL BLOCK FOR ANNUNCIATION	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XAN	CABUR			
	23	TERMINAL BLOCK FOR SIGNALLING TO EVENT RECORDER	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XEN	CABUR			
	5	TERMINAL BLOCK FOR SIGNALLING TO FAULT RECORDER	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XFR	CABUR			
F	14	TERMINAL BLOCK FOR SIGNALLING TO SCADA INTERFACE PANEL	CBD-4, SCREW TYPE, FEED THROUGH TERMINAL			-XSC	CABUR			
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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-1 PANEL (=D02+R1) COMPONENT LIST	Drawing no. P60194-E-RLC-SC-001	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type AC-1	Sheet no. 04a

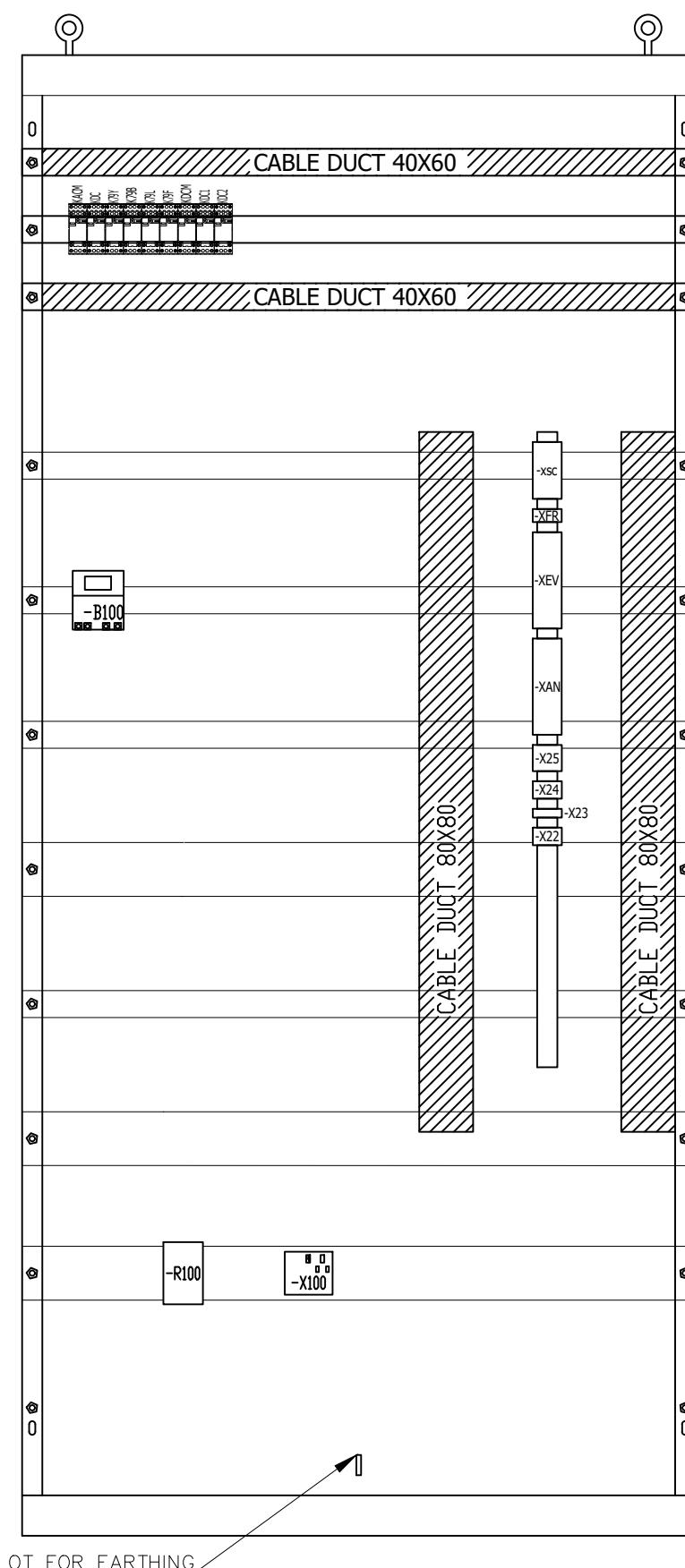
FRONT VIEW



LEFT SIDE VIEW



RIGHT SIDE VIEW

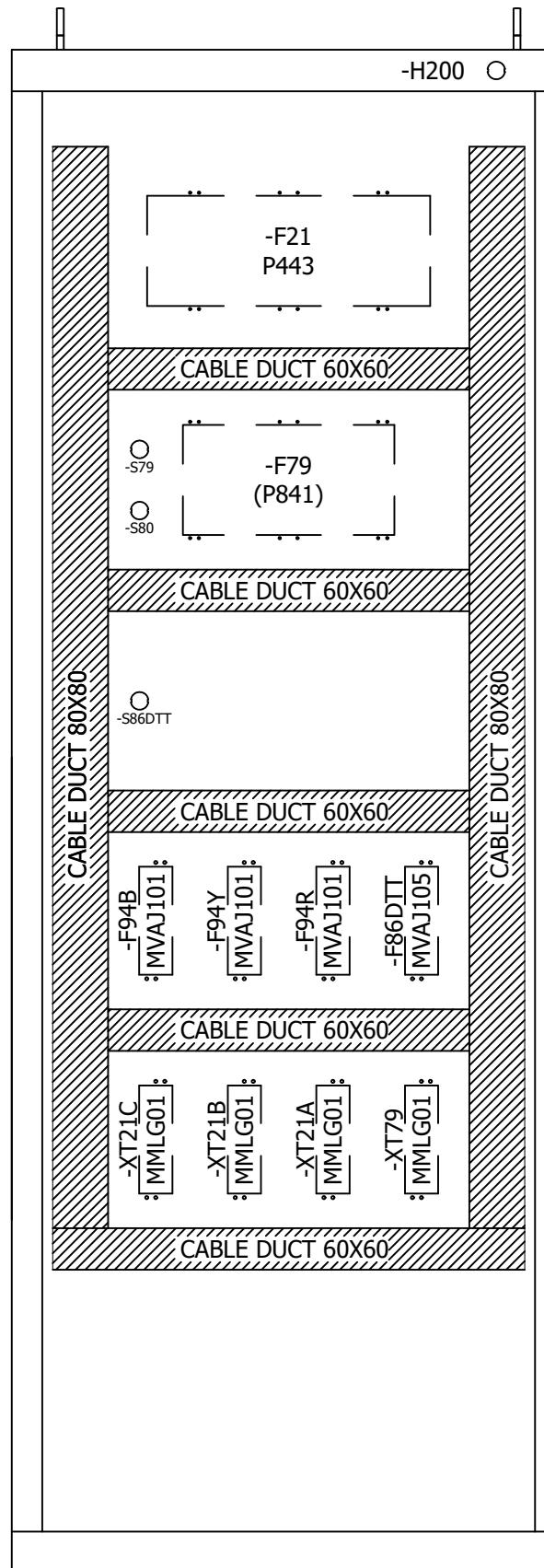


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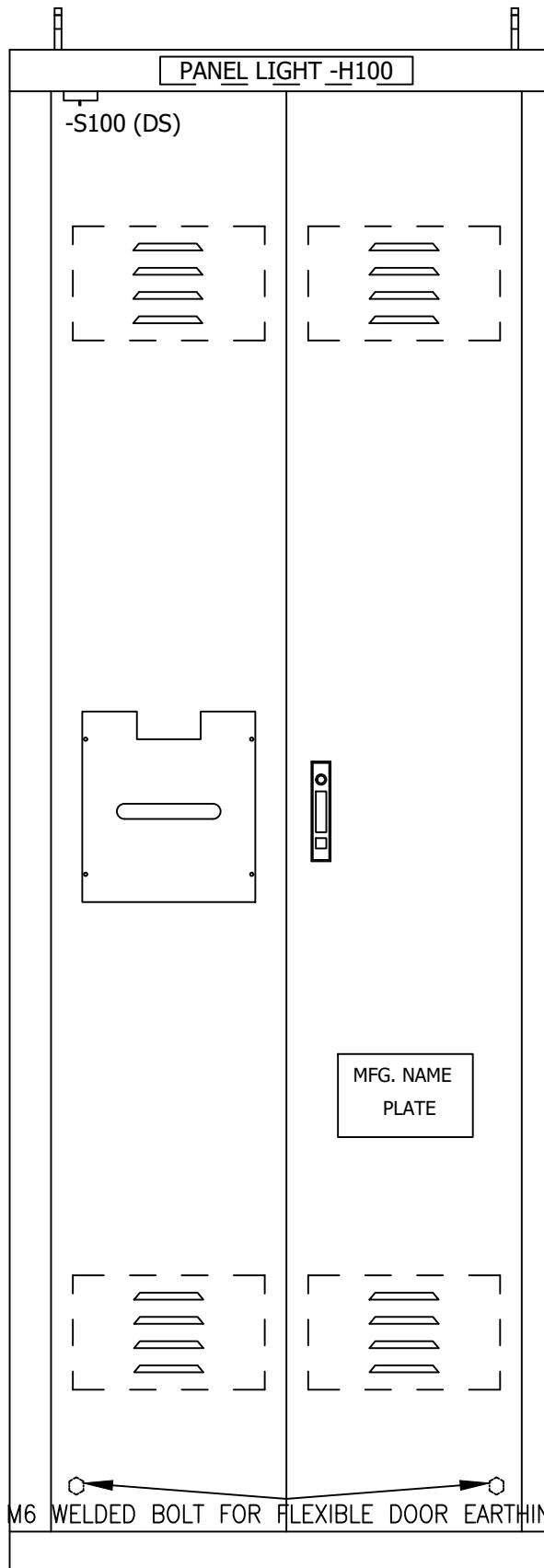
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AD
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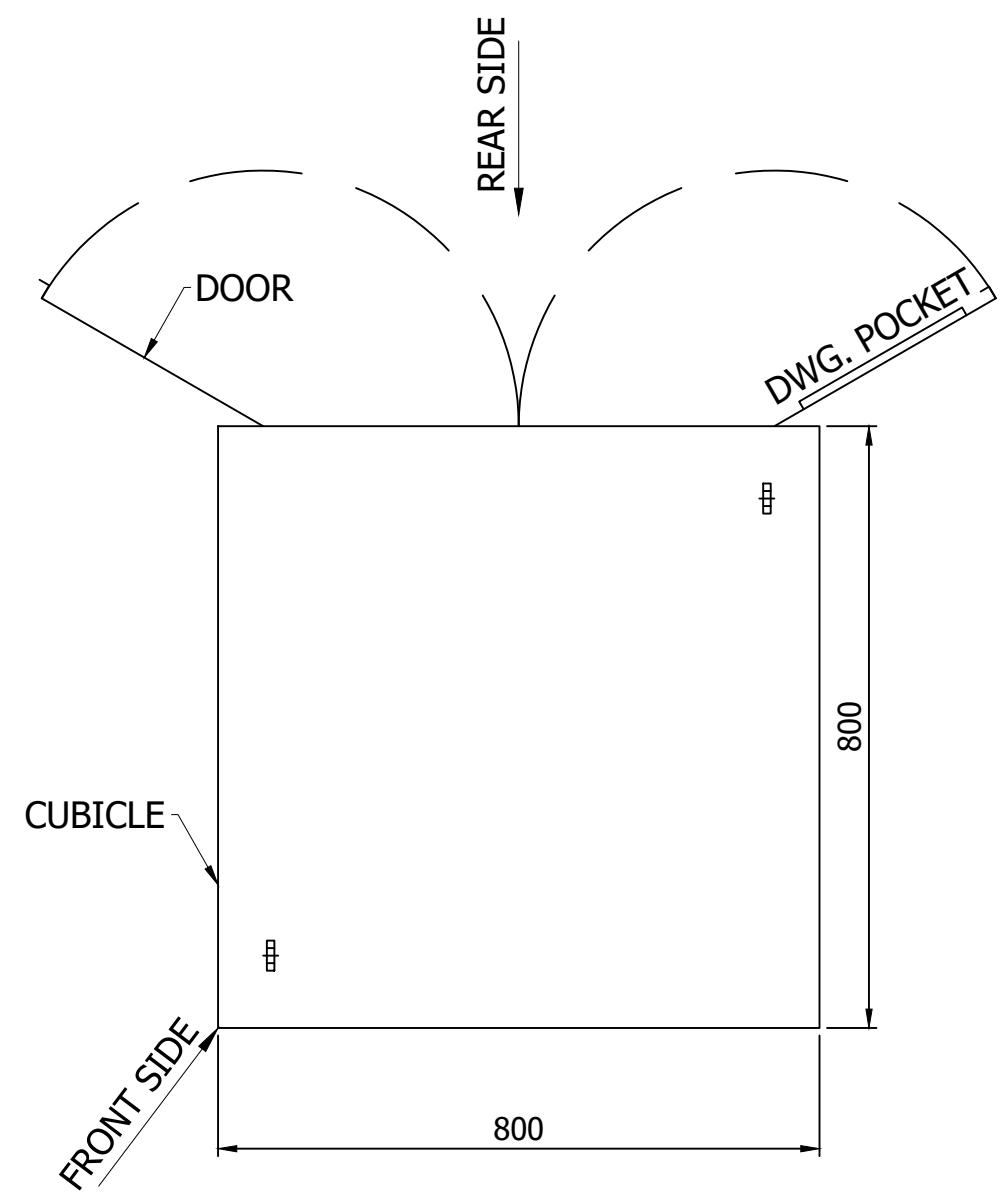
BACK VIEW WITHOUT DOOR



BACK VIEW WITH DOOR



TOP VIEW



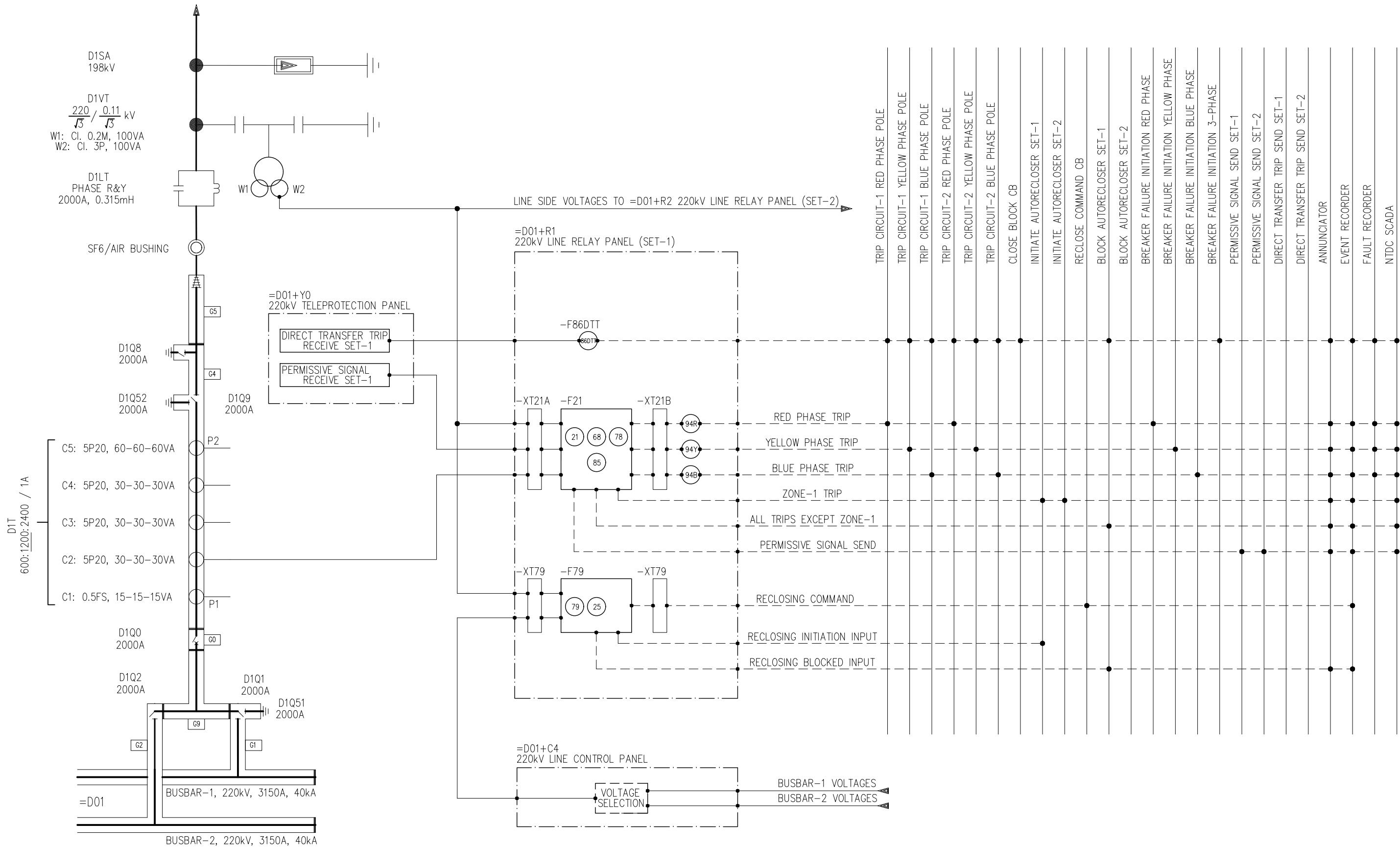
NOTE:-

- 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.

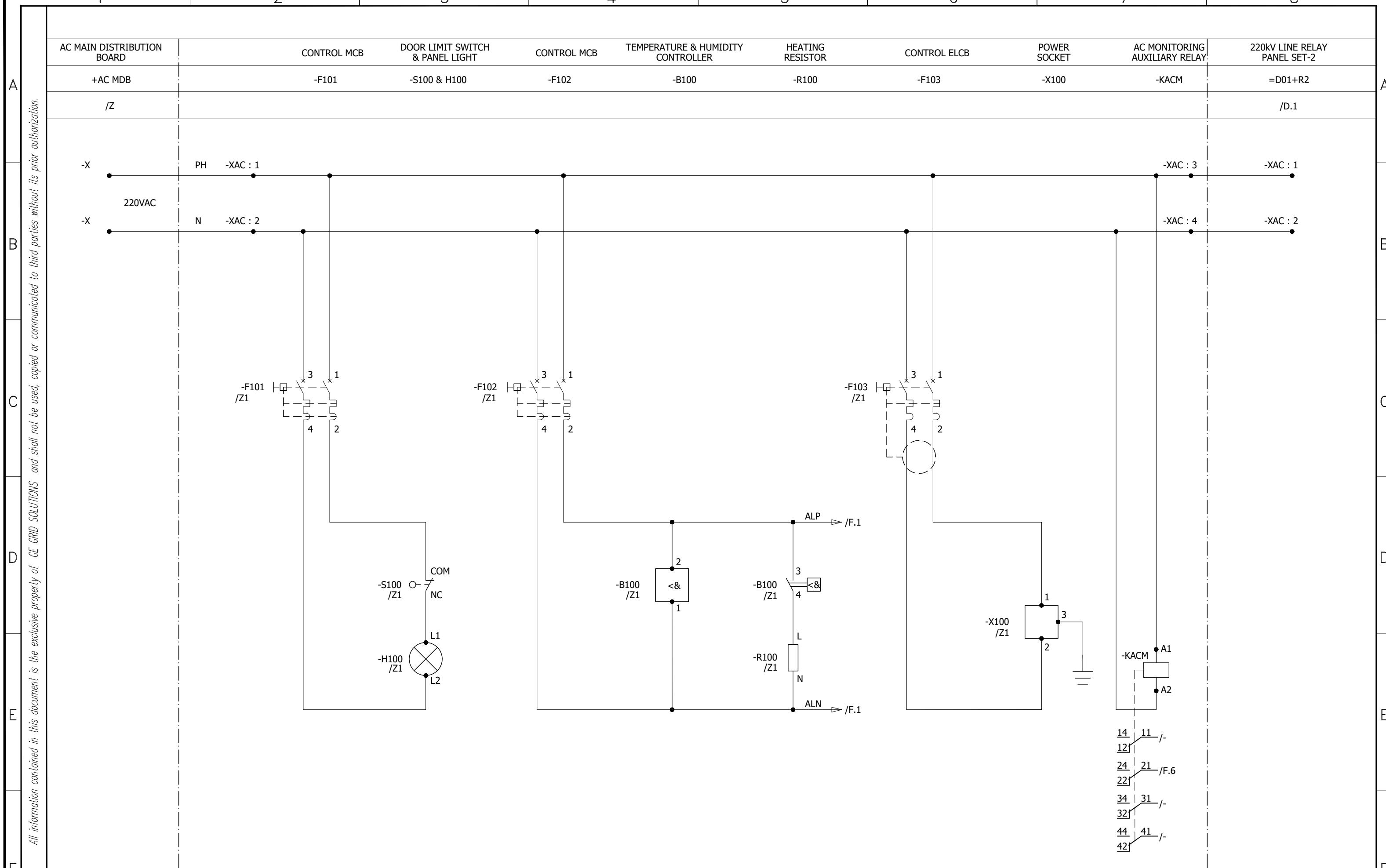
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									Project no. P-60194	
REV.	DESCRIPTION	DATE	DRAWER						Sheet type AD1	Sheet no. 05a

220kV KSK

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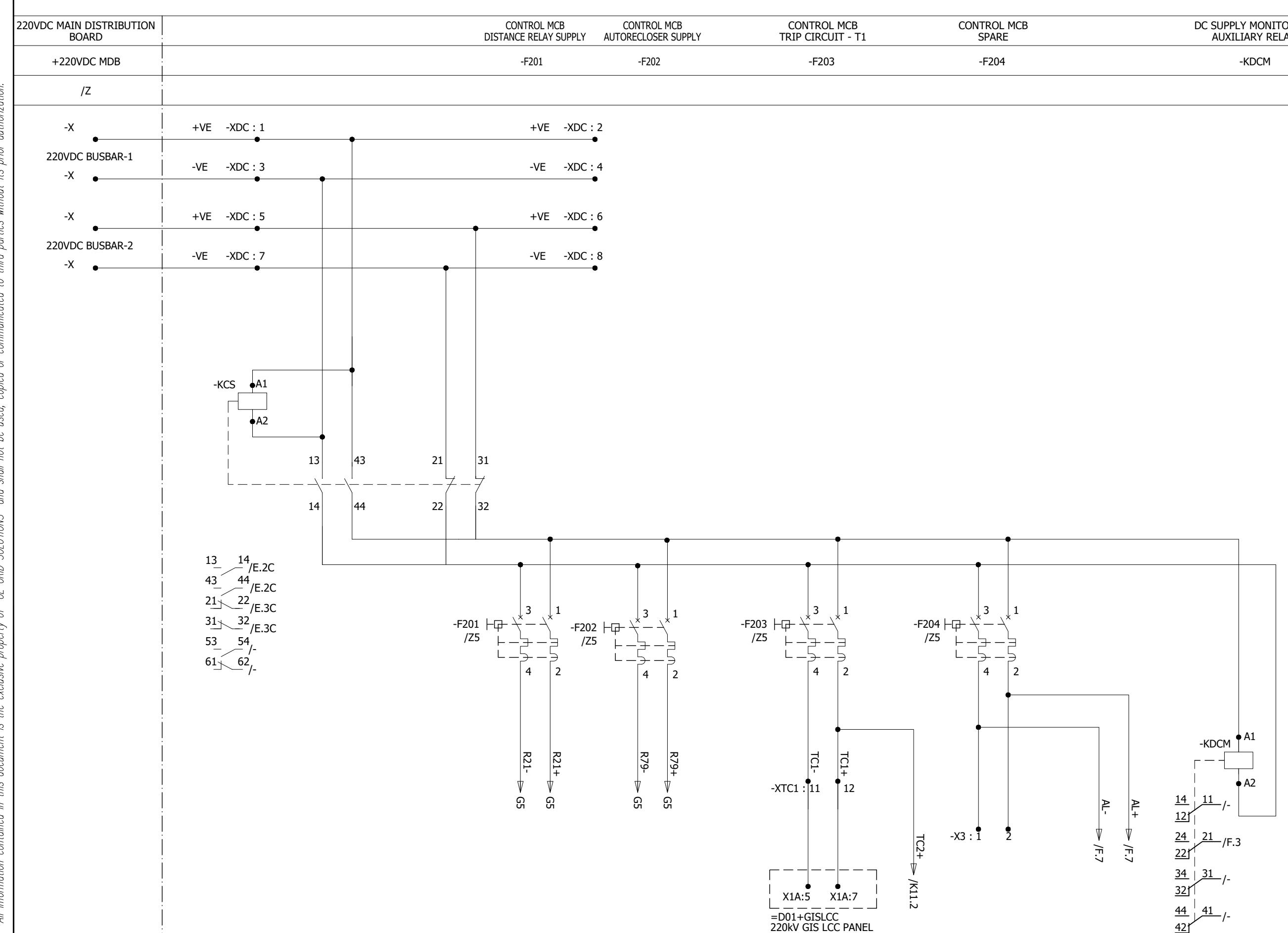


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REV.	DESCRIPTION	DATE	DRAWER							
1	2	3	4							
								Project no. P-60194	Sheet type AE	Sheet no. 06



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-1 PANEL (=D02+R1) AC SUPPLY DISTRIBUTION	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
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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 220kV LINE RELAY SET-1 PANEL (=D02+R1) DC SUPPLY DISTRIBUTION	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type E
									Sheet no. 08

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220V DC CIRCUIT FAULTY

220V DC CIRCUIT FAULTY INDICATION

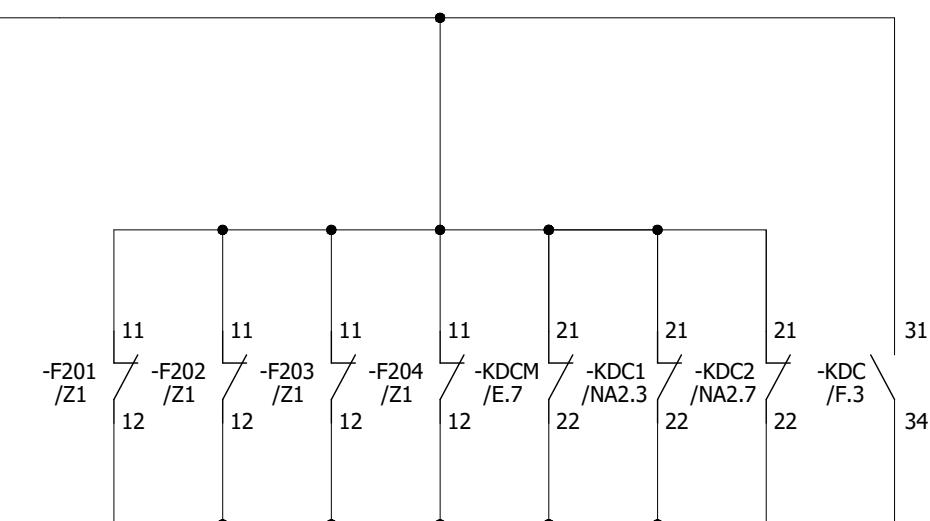
220V AC CIRCUIT FAULTY

-KDC

-H200

-KAC

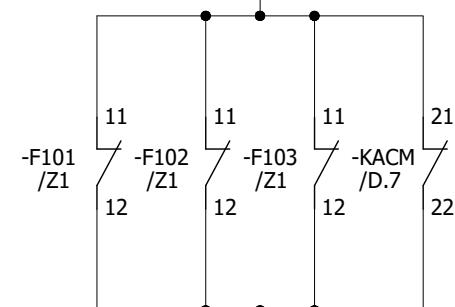
/D.5 ➔ ALP



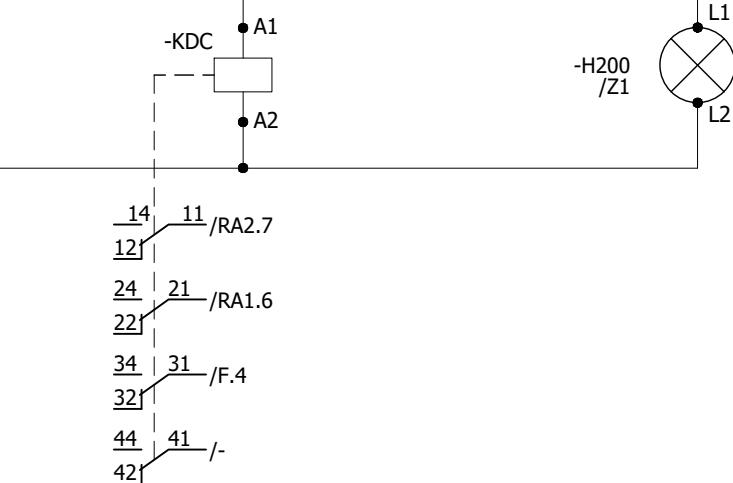
31

34

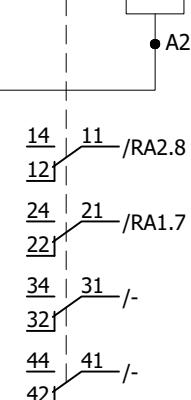
/E.5 ➔ AL+



/D.5 ➔ ALN

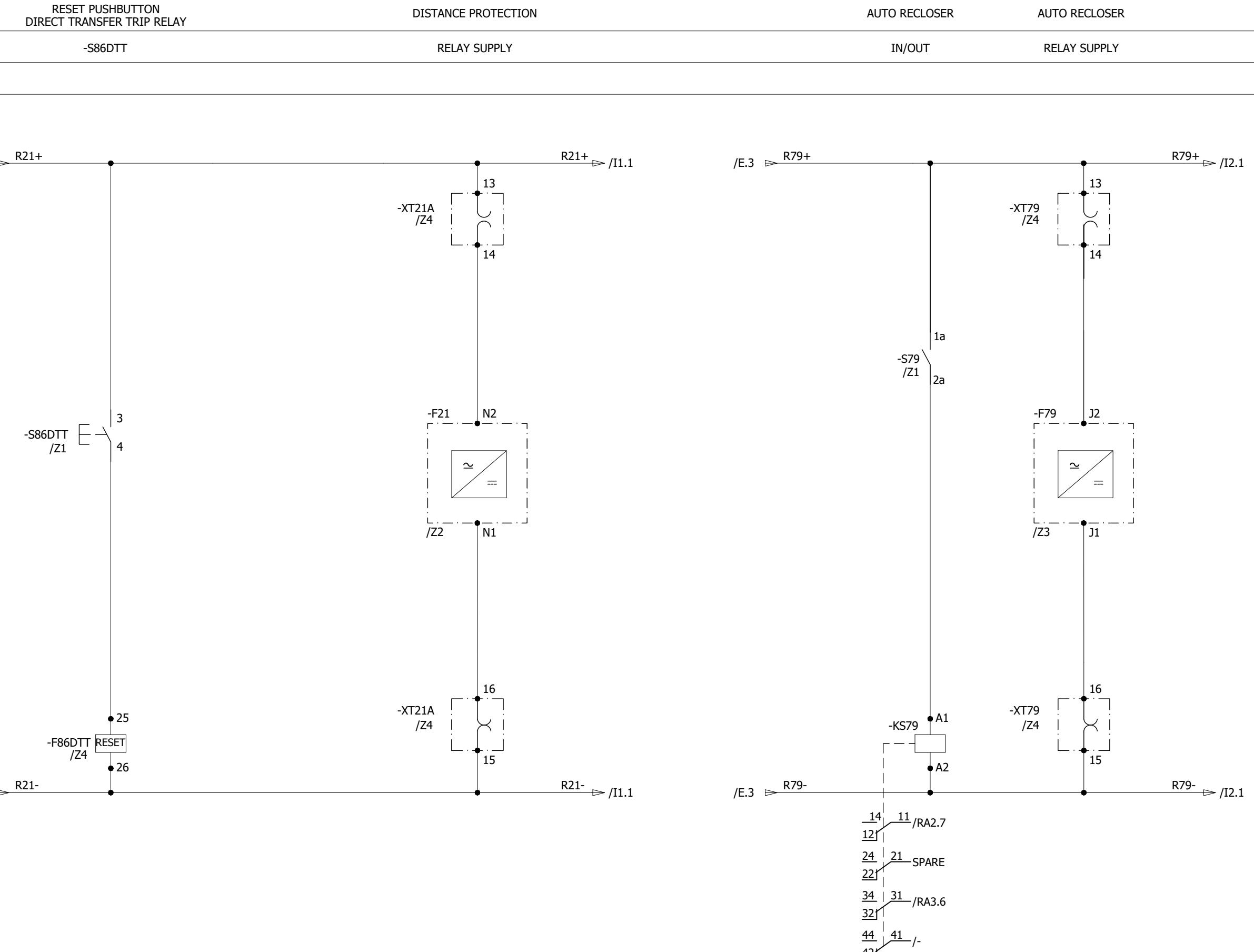


/E.5 ➔ AL-

A
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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-1 PANEL (=D02+R1) AC/DC SUPPLY FAILURE CIRCUIT	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type F
									Sheet no. 09

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	AS BUILT	DATE	DRAWER	Manufacturer	Contractor	Client	Project	Title	Drawing no.
0	20.11.2018	ASJ		 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-1 PANEL (=D02+R1) RELAY CONTROL & SUPPLY	P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type G Sheet no. 10

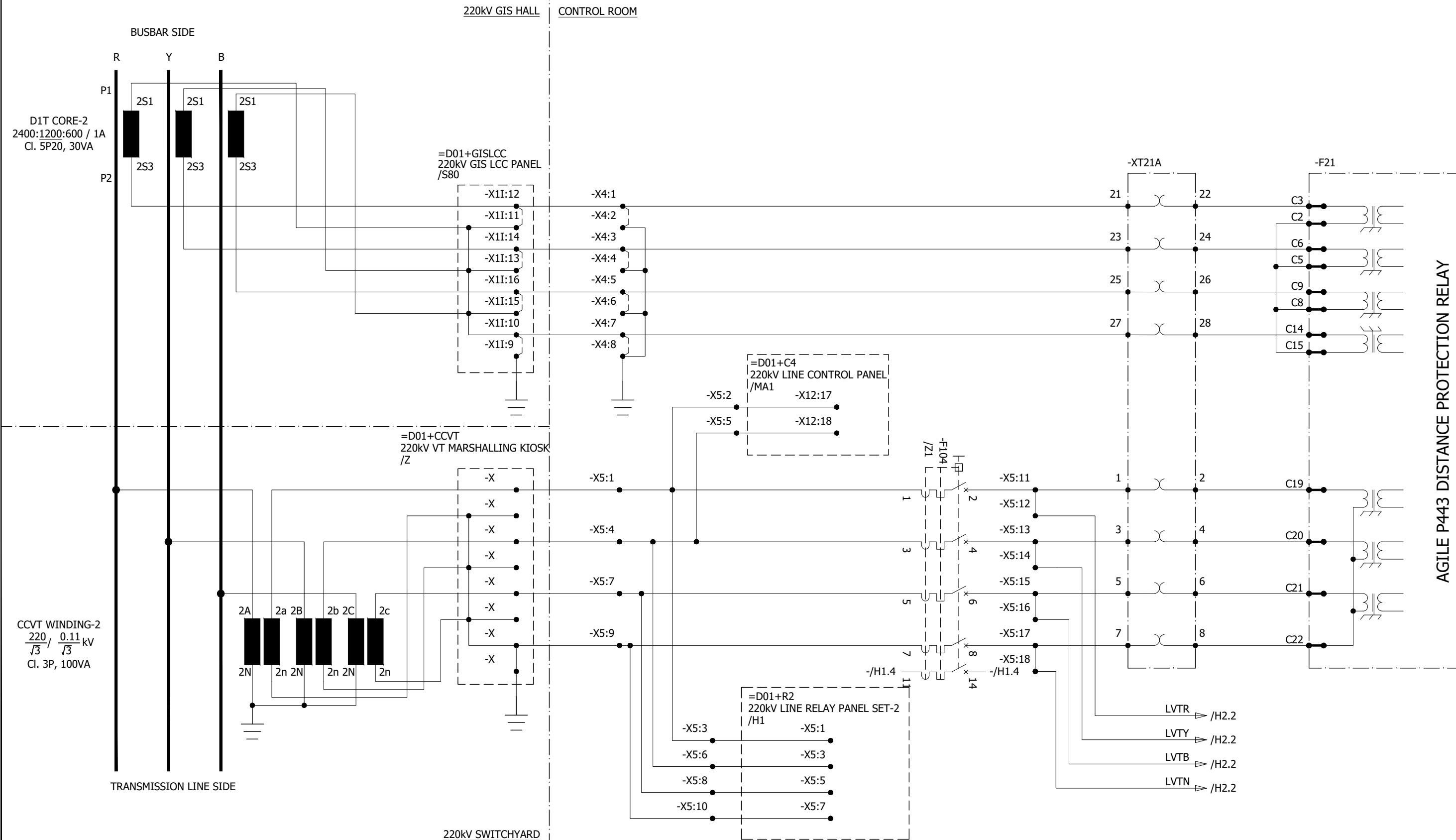
TEST BLOCK DISTANCE PROTECTION RELAY

-XT21A -F21

/Z4 /Z4

AGILE P443 DISTANCE PROTECTION RELAY

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0	AS BUILT	20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
				EPESOL	Grid Solutions	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV LINE RELAY SET-1 PANEL (=D02+R1) DISTANCE PROTECTION CT/VT CIRCUIT	P60194-E-RLC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type H1	Sheet no. 11

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220KV LINE CONTROL
PANEL

=D01+C4

/MA1

TEST BLOCK

AUTORECLOSER
RELAY

-XT79

-F79

/Z4

/Z4

-X12:33

CSR

-X5:19

-X12:34

CSY

-X5:20

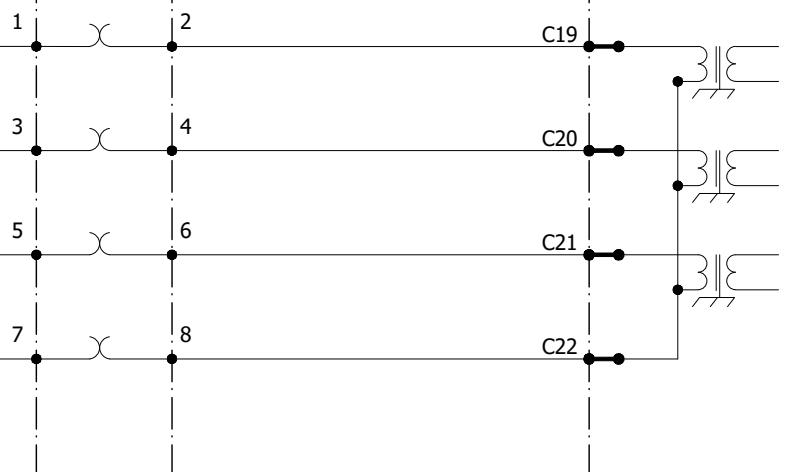


/H1.7 ▷ LVTR

/H1.7 ▷ LVTY

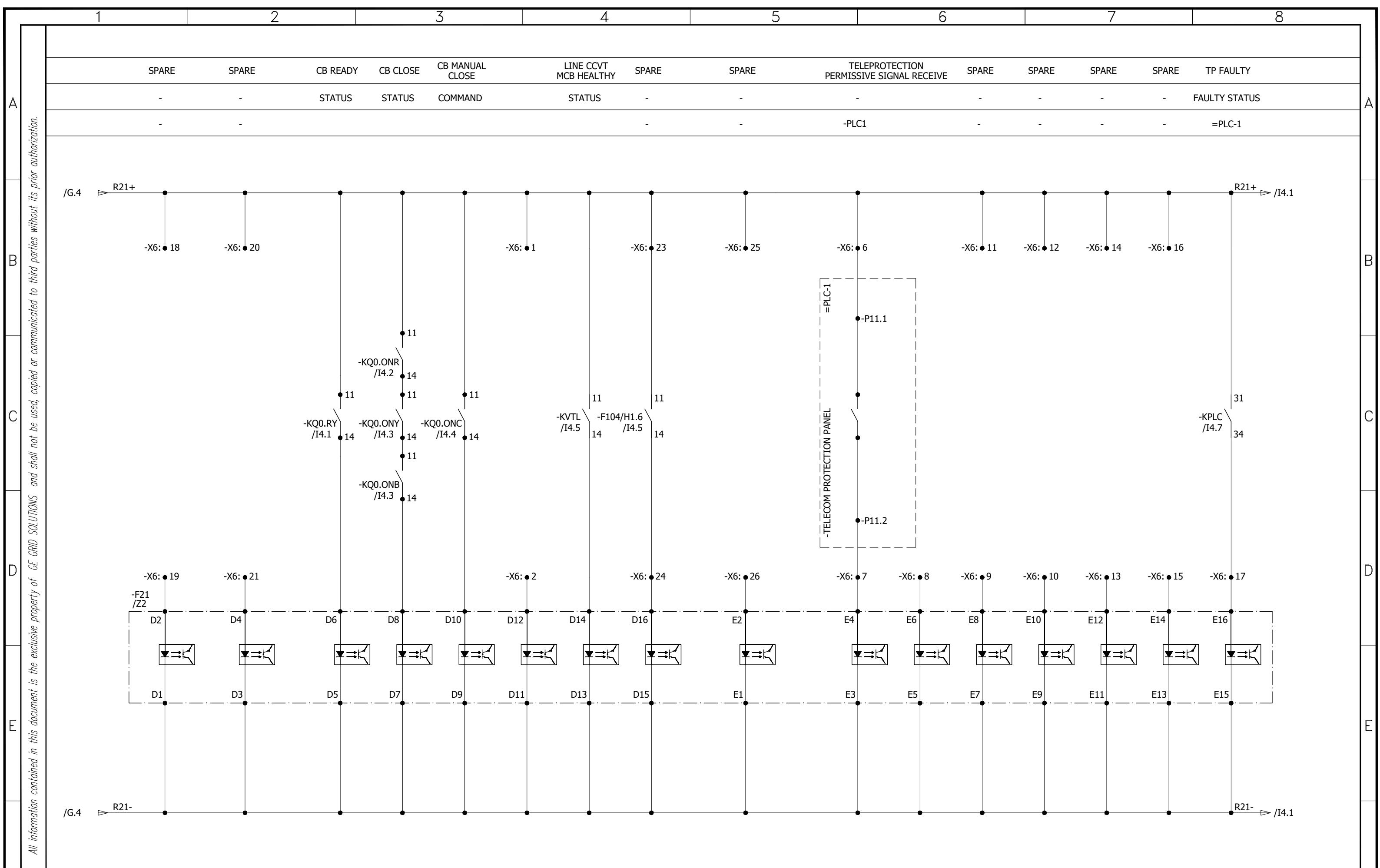
/H1.7 ▷ LVTB

/H1.7 ▷ LVTN

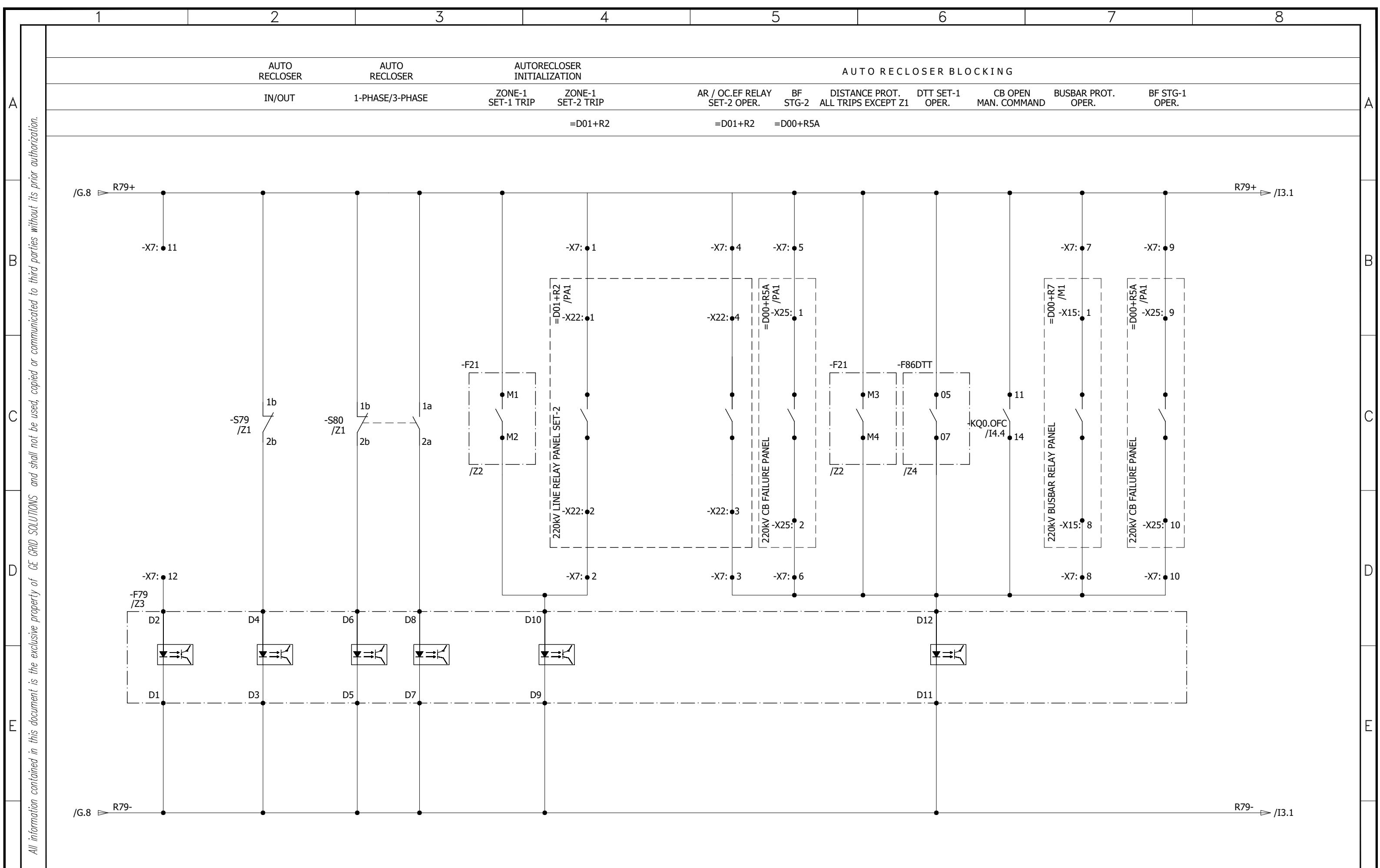


AGILE P841 AUTORECLOSER RELAY

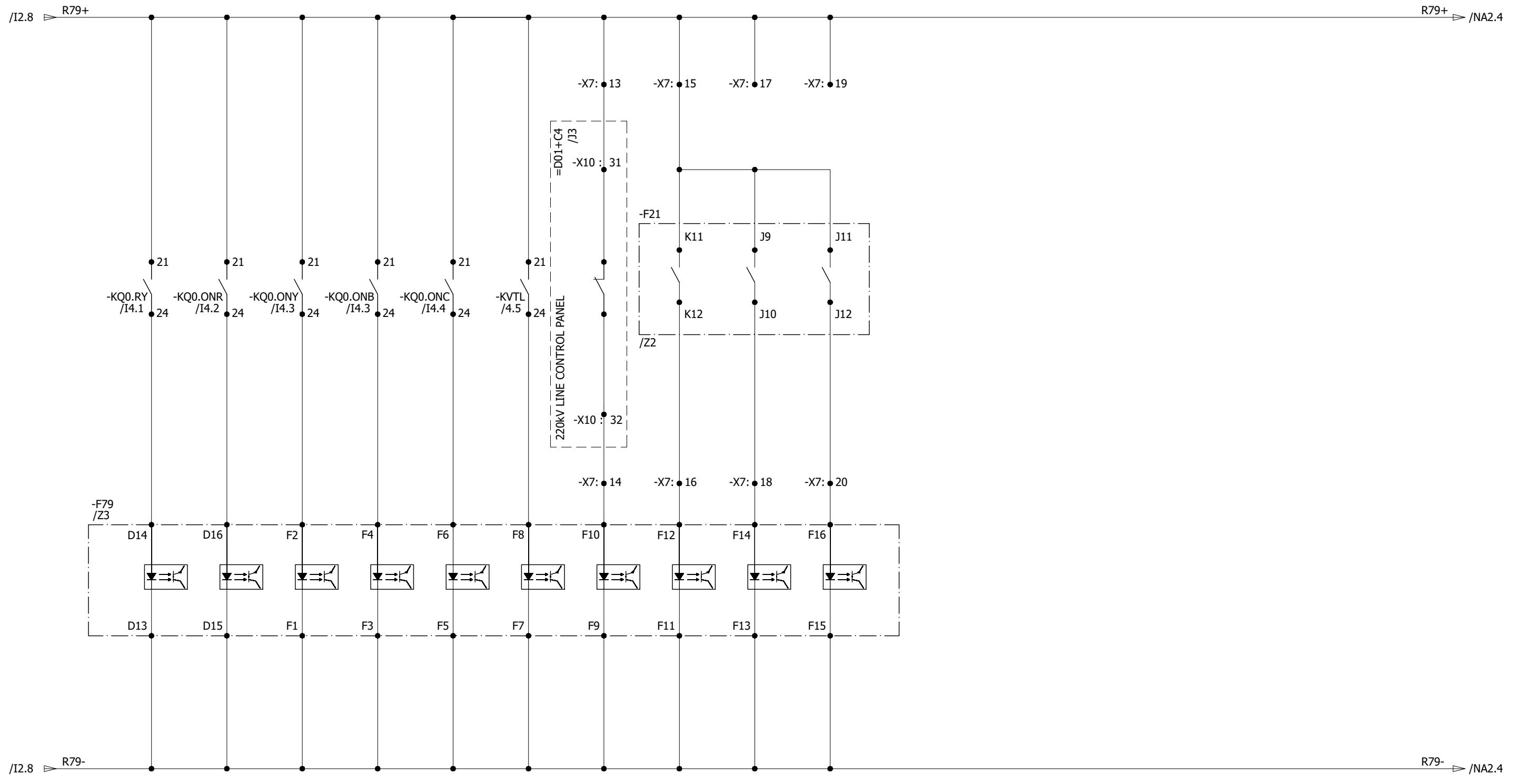
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type H2 Sheet no. 12



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-1 PANEL (=D02+R1) DISTANCE RELAY INPUTS	P-60194-E-RLC-SC-001	Project no.	
										Sheet type	Sheet no.	
1	2	3	4	5	6	7	8			I1	13	



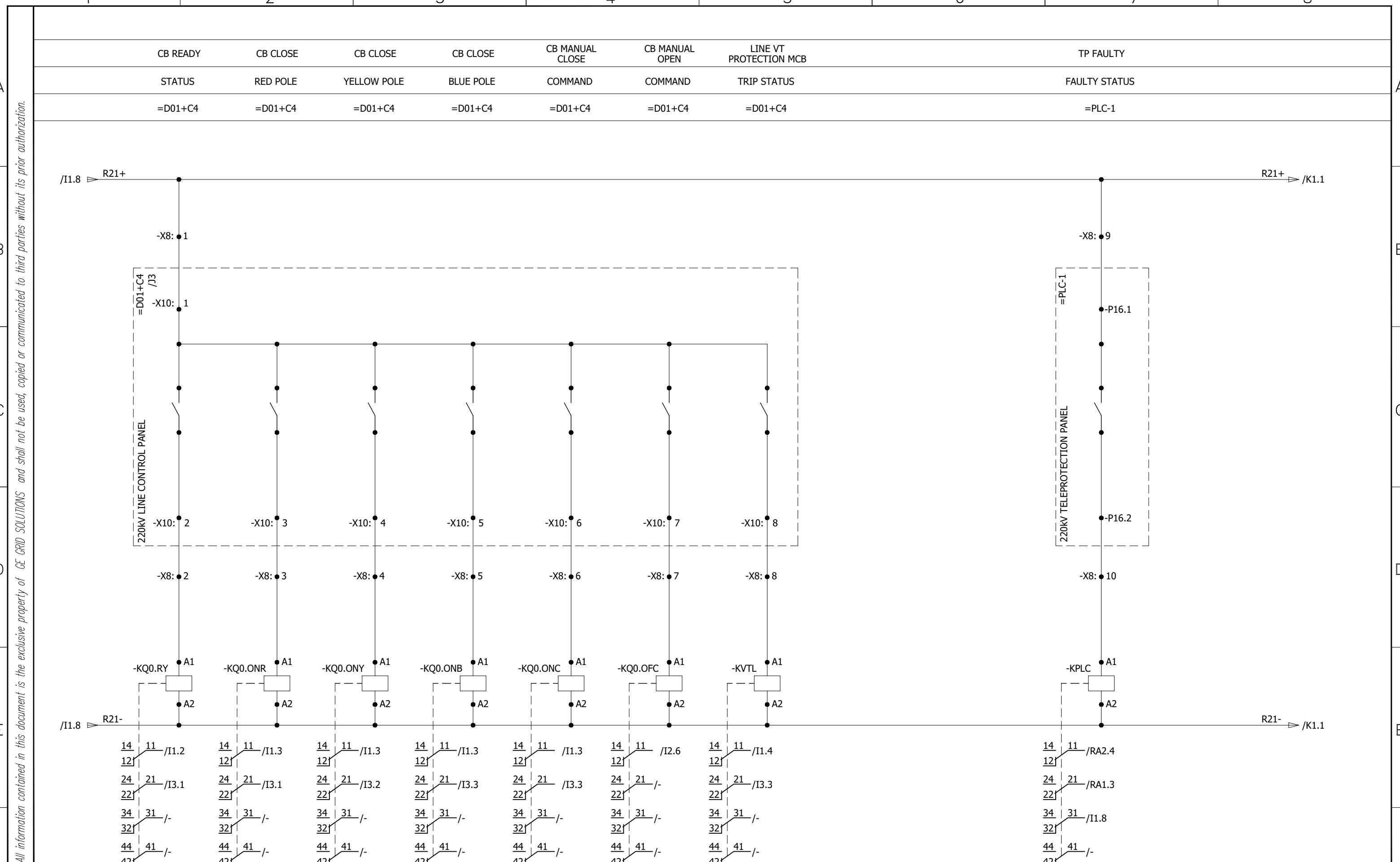
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type I2	Sheet no. 14
1		2	3	4	5	6	7	8			



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0	AS BUILT	20.11.2018	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 220kV LINE RELAY SET-1 PANEL (=D02+R1) AUTO RECLOSE INPUTS	Drawing no. P60194-E-RLC-SC-001
									Project no. P-60194
									Sheet type I3
REV.	DESCRIPTION	DATE	DRAWER						Sheet no. 15
1	2	3	4	5	6	7	8		

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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-1 PANEL (=D02+R1) SYSTEM INPUTS	P60194-E-RLC-SC-001		
									Project no. P-60194	Sheet type I4	Sheet no. 16

DISTANCE PROTECTION GENERAL TRIPS

DIRECT TRANSFER TRIP

PERMISSIVE TRANSFER TRIP

RED-PH

YELLOW-PH

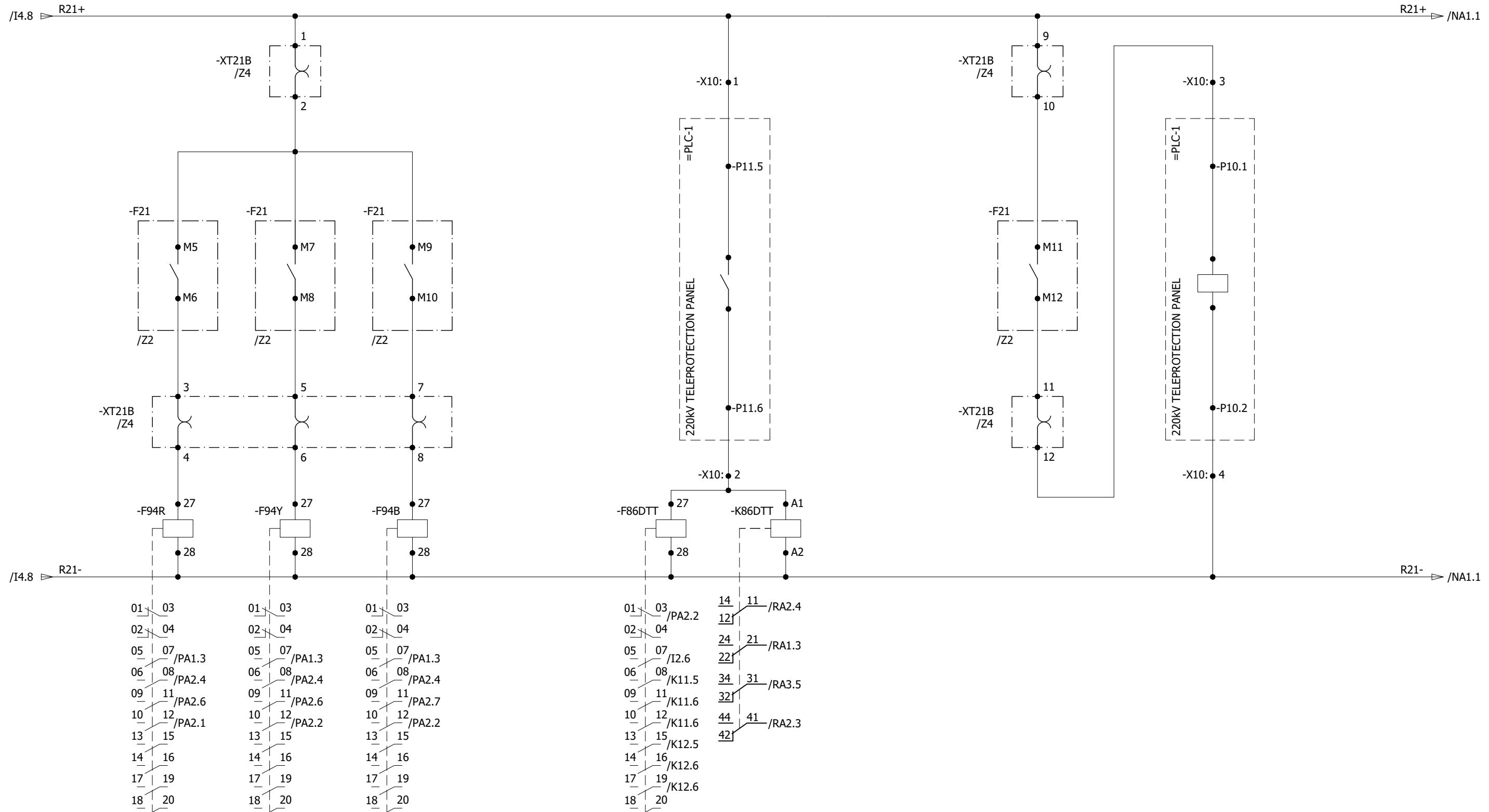
BLUE-PH

RECEIVED

SENT

=PLC-1

=PLC-1



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 220kV LINE RELAY SET-1 PANEL (=D02+R1) PROTECTION TRIPS	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K1
									Sheet no. 17

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220KV GIS LCC
PANEL

DISTANCE PROTECTION SET-1 GENERAL TRIPS

DIRECT TRANSFER TRIP - RECEIVED

220KV LINE RELAY PANEL
SET-2

=D01+GISLCC

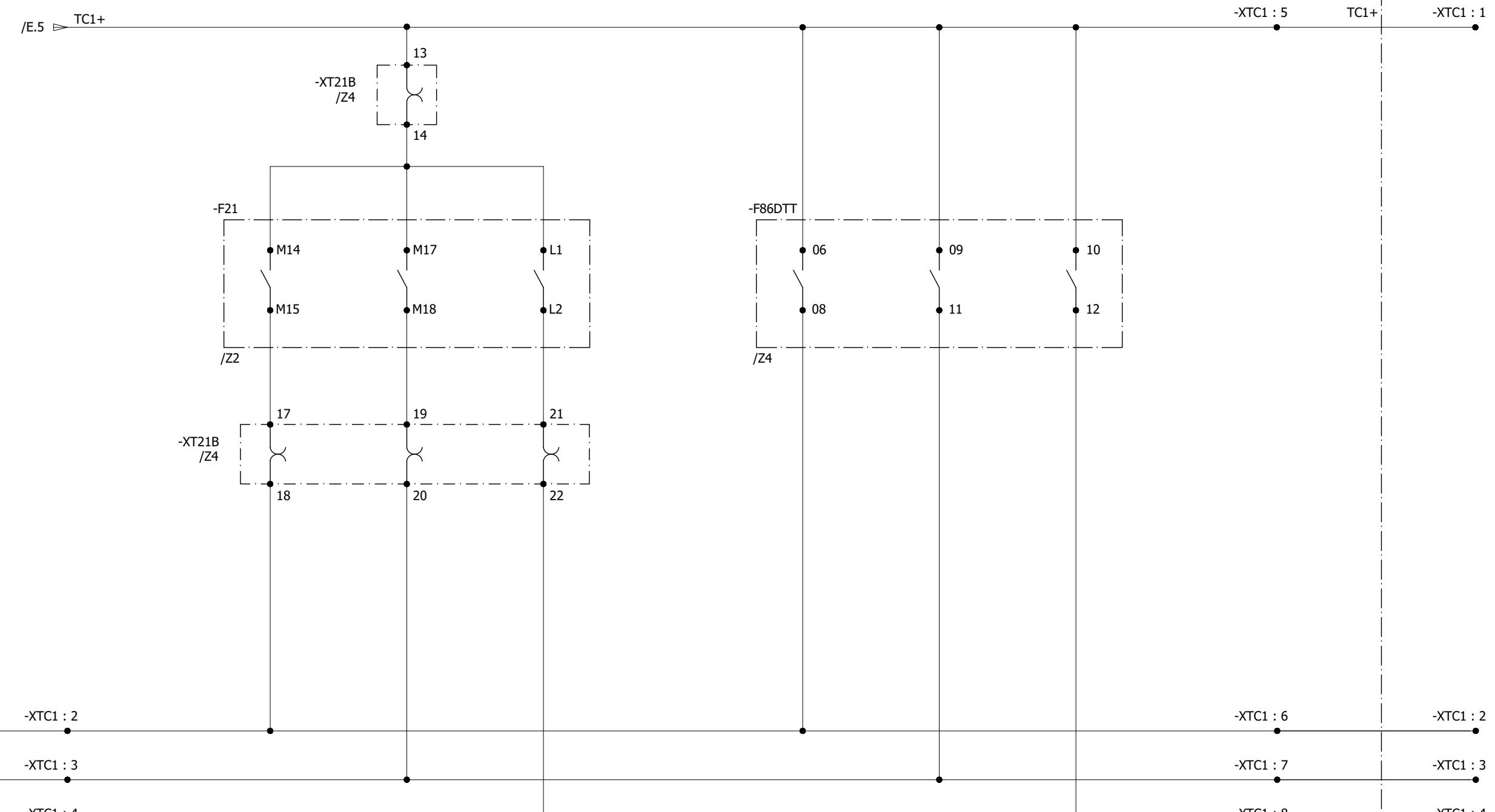
RED-PH YELLOW-PH BLUE-PH

RED-PH YELLOW-PH BLUE-PH

=D01+R2

/L52

/K11



0	AS BUILT		20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.			
REV.	DESCRIPTION		DATE	DRAWER	EPEPSOL 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-1 PANEL (=D02+R1) TRIP CIRCUIT FOR COIL - 1	P-60194-E-RLC-SC-001	Project no.	Sheet type	Sheet no.
1	2	3	4	5	6	7	8			P-60194	K11	18	

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220KV LINE RELAY PANEL
SET-2

DISTANCE PROTECTION SET-2 GENERAL TRIPS

DIRECT TRANSFER TRIP - RECEIVED

220KV CIRCUIT BREAKER
FAILURE PANEL

=D01+R2

RED-PH YELLOW-PH BLUE-PH

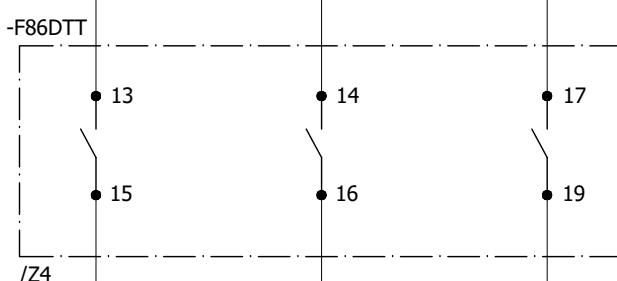
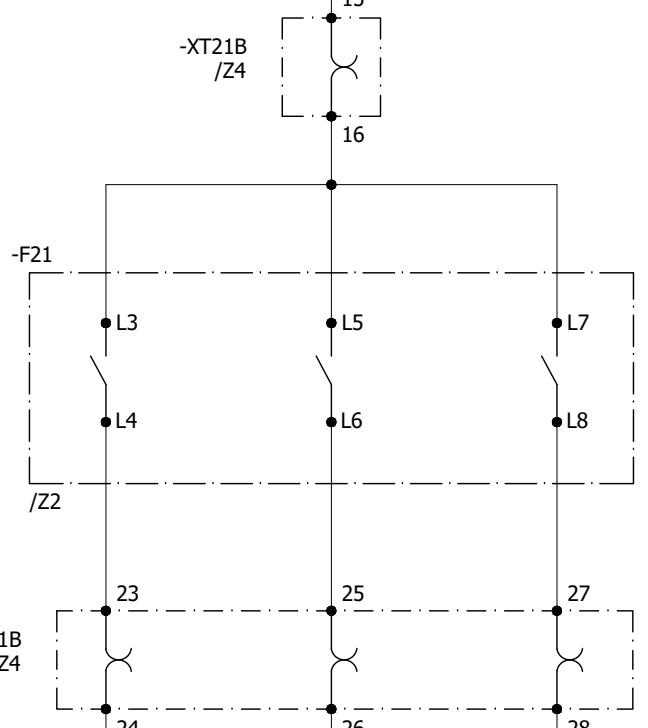
RED-PH YELLOW-PH BLUE-PH

=D00+R5A

/K12

/Z

-XTC2 : 5 +TC2 -XTC2 : 1 -XTC2 : 5 +TC2 -X



-XTC2 : 6 -XTC2 : 2 -XTC2 : 6
-XTC2 : 7 -XTC2 : 3 -XTC2 : 7
-XTC2 : 8 -XTC2 : 4 -XTC2 : 8

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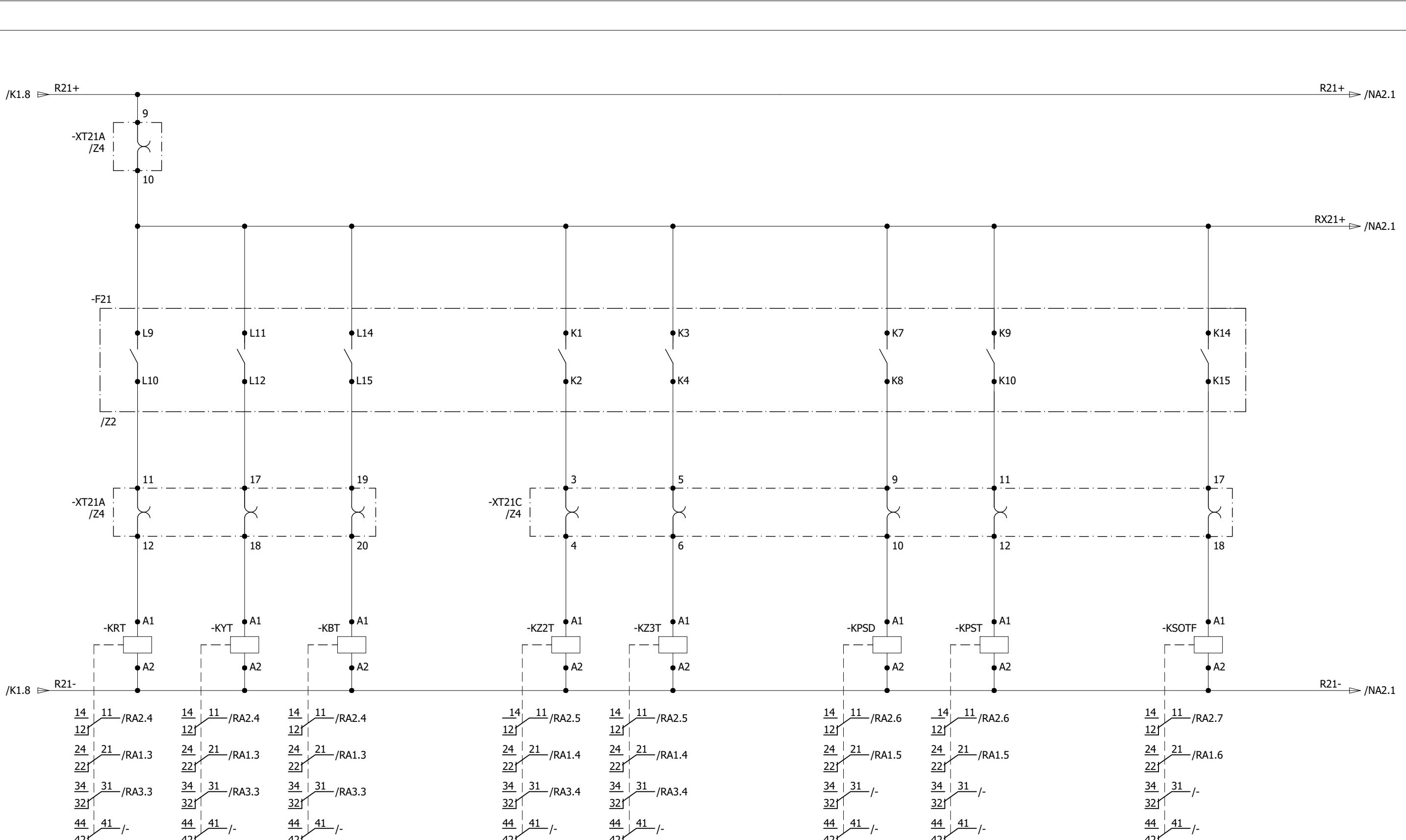
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0	AS BUILT	20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
				EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-1 PANEL (=D02+R1) TRIP CIRCUIT FOR COIL - 2	P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. Sheet type Sheet no.
									P-60194 K12 19

DISTANCE PROTECTION SET-1 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
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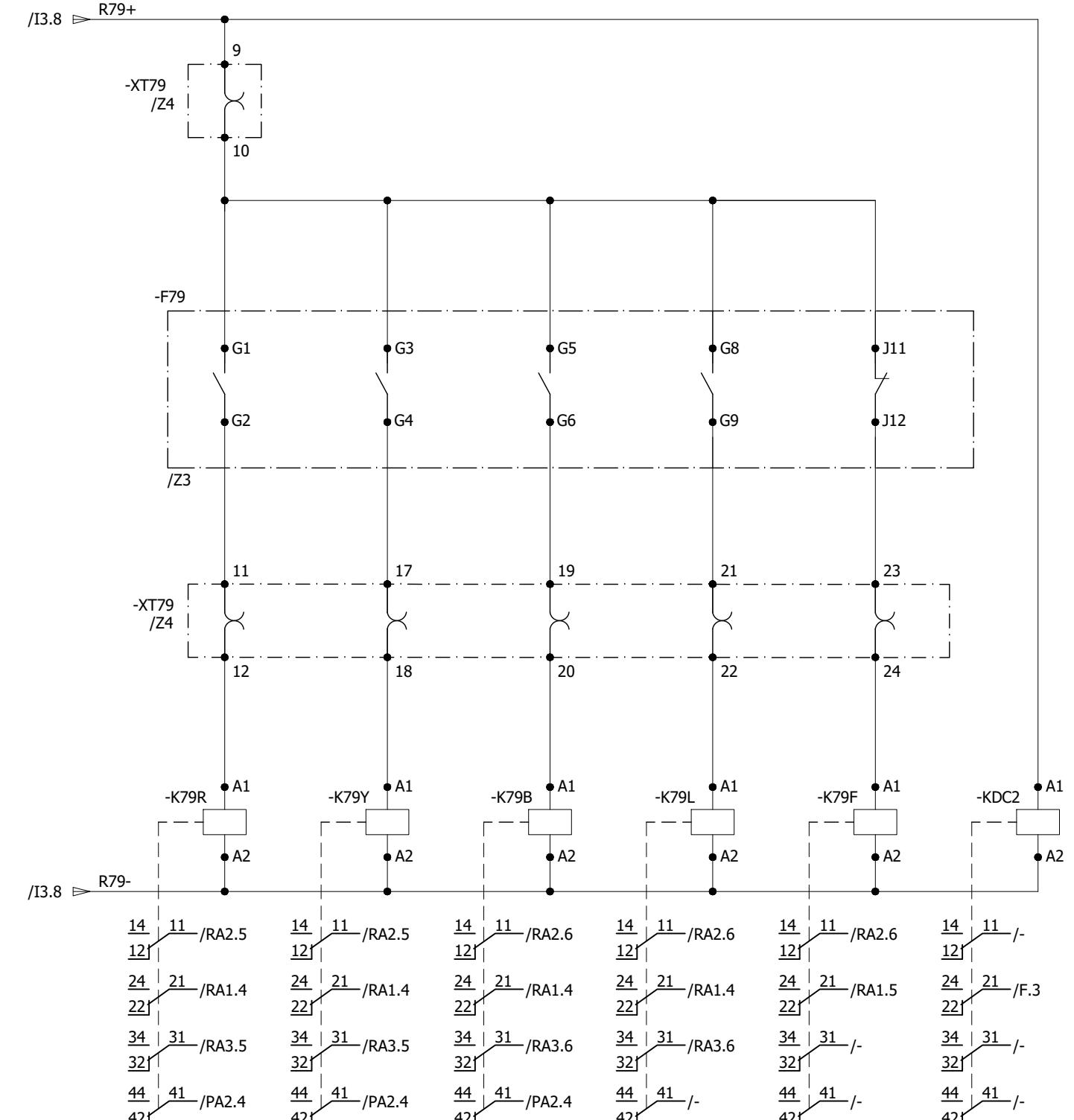
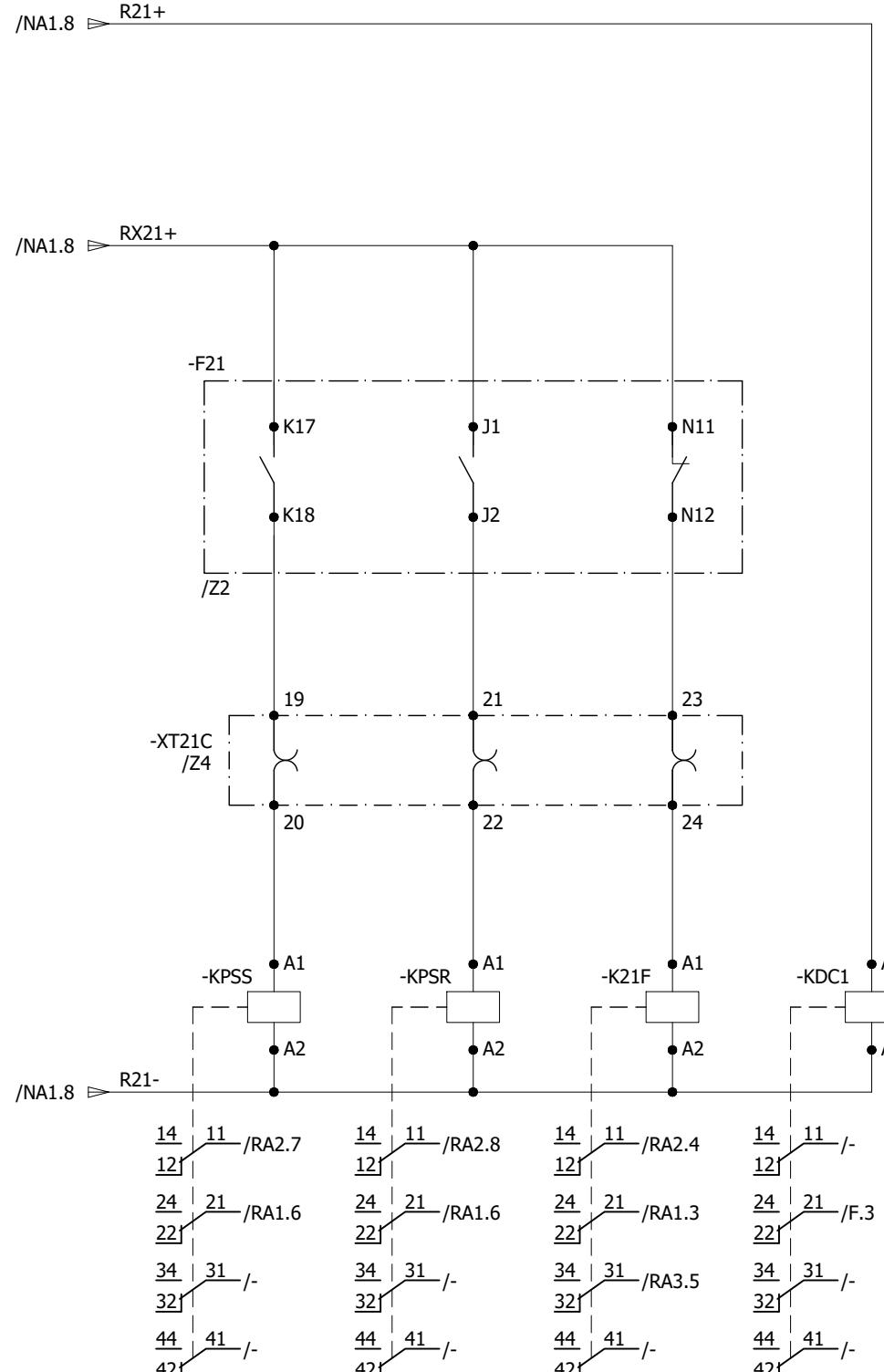


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0	AS BUILT	20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV LINE RELAY SET-1 PANEL (=D02+R1) SYSTEM ALARMS	P60194-E-RLC-SC-001
									Project no. P-60194 Sheet type NA1 Sheet no. 20

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DISTANCE PROTECTION SET-1 ALARMS			R21+ DC SUPPLY MONITORING	AUTORECLOSER SET-1 ALARMS			R79+ DC SUPPLY MONITORING		
PERMISSIVE INTER TRIP SENT	PERMISSIVE INTER TRIP RECEIVED	PROTECTION FAULTY	+KDC1	RED-POLE RECLOSE	YELLOW-POLE RECLOSE	BLUE-POLE RECLOSE	AUTORECLOSER LOCKED OUT	PROTECTION FAULTY	+KDC2



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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-1 PANEL (=D02+R1) SYSTEM ALARMS	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type NA2
									Sheet no. 21

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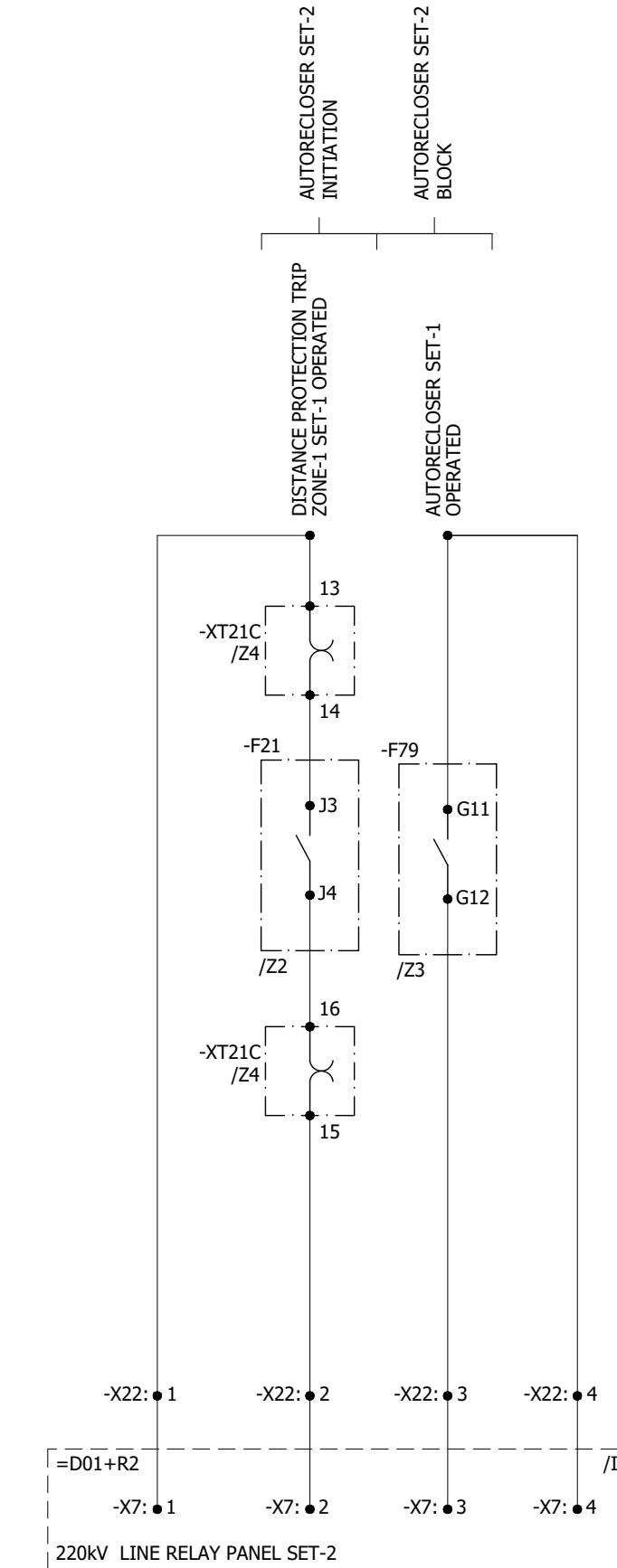
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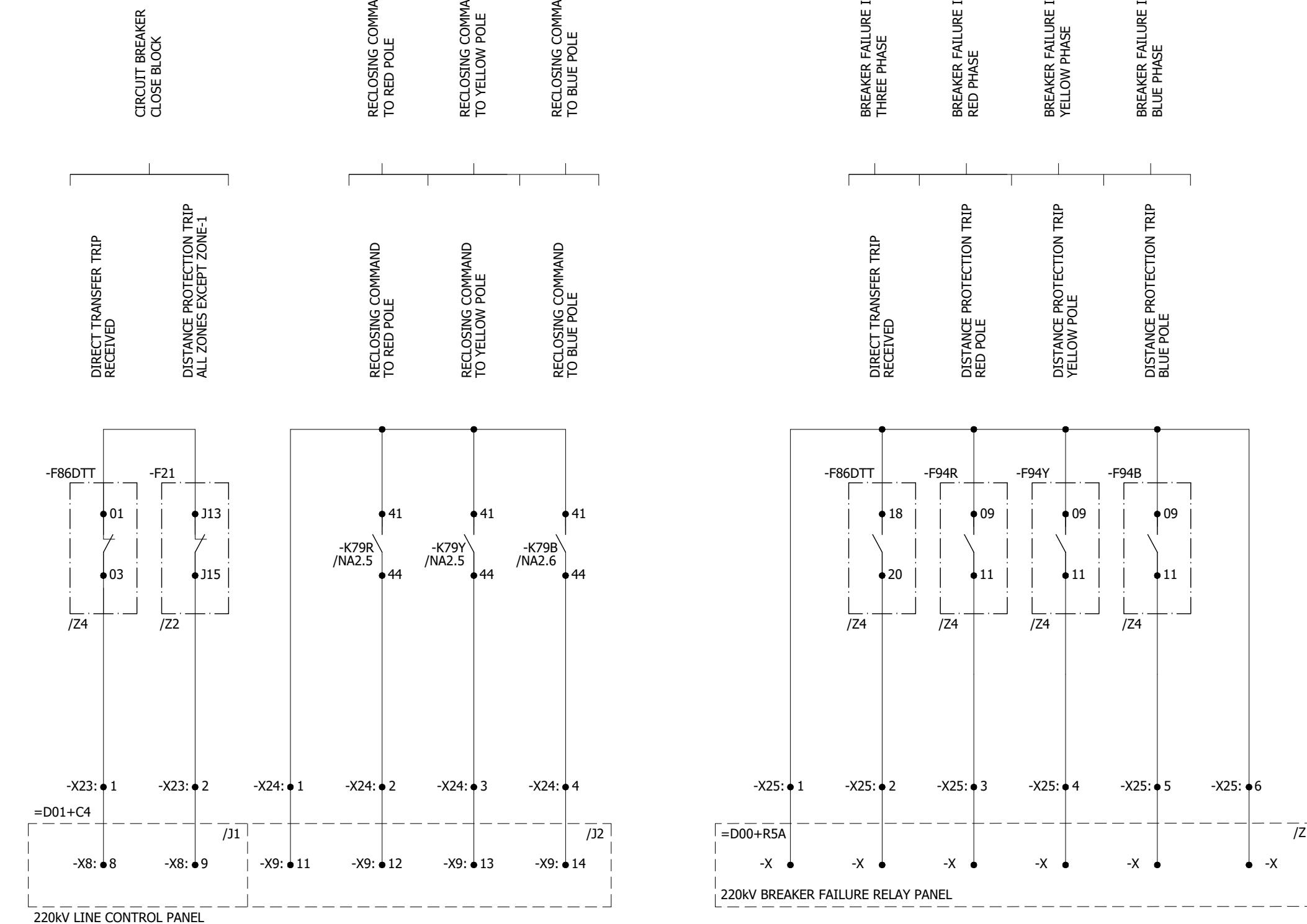
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0	AS BUILT	20.11.2018	ASJ	Manufacturer  EPESOL 21-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV LINE RELAY SET-1 PANEL (=D02+R1) PROTECTION INTER-CIRCUITS	Drawing no. P60194-E-RLC-SC-001	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type PA1	Sheet no. 22

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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-1 PANEL ($=D02+R1$) PROTECTION INTER-CIRCUITS	Drawing no.		
									P60194-E-RLC-SC-001		
									Project no.	Sheet type	Sheet no.
REV.	DESCRIPTION	DATE	DRAWER						P-60194	PA2	23

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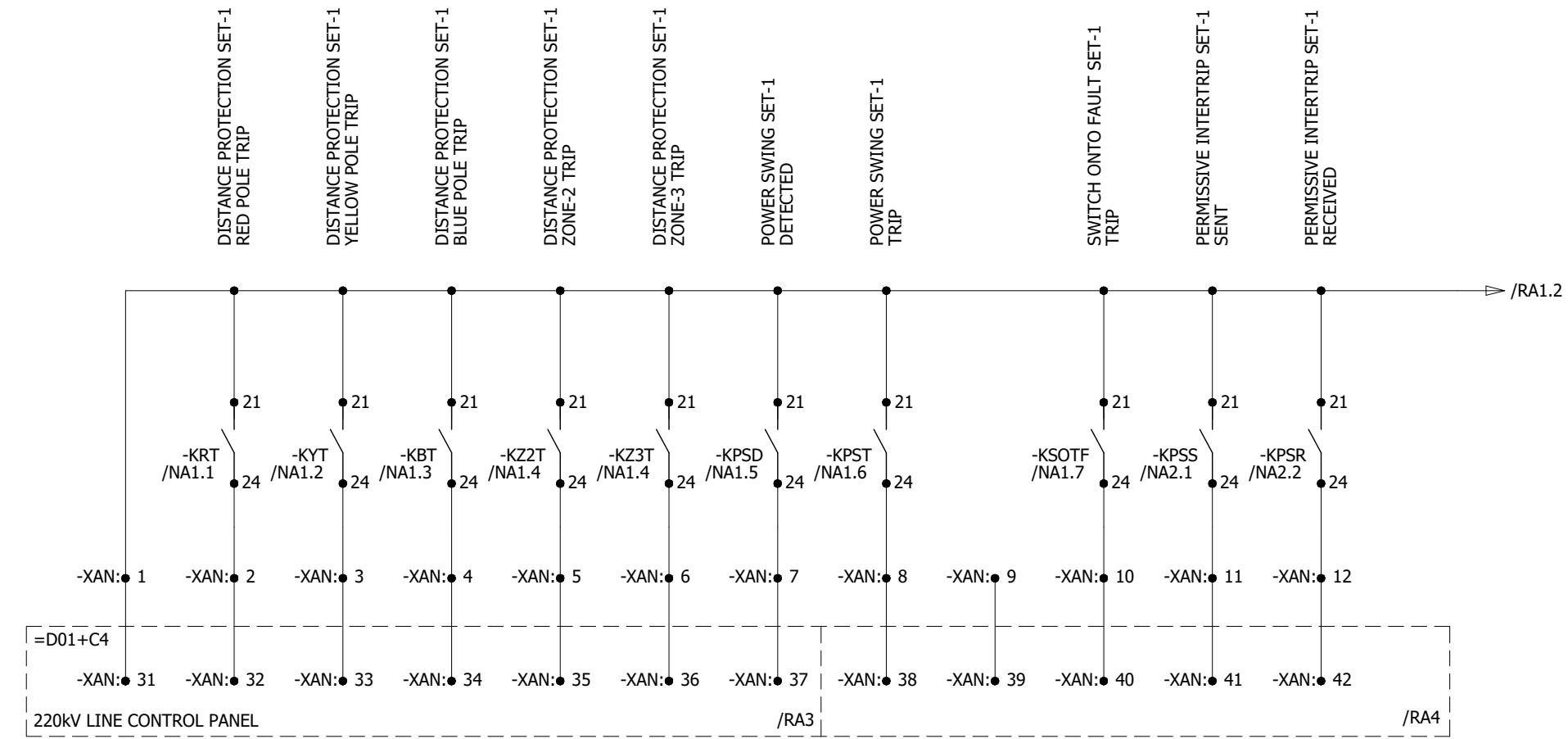
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E

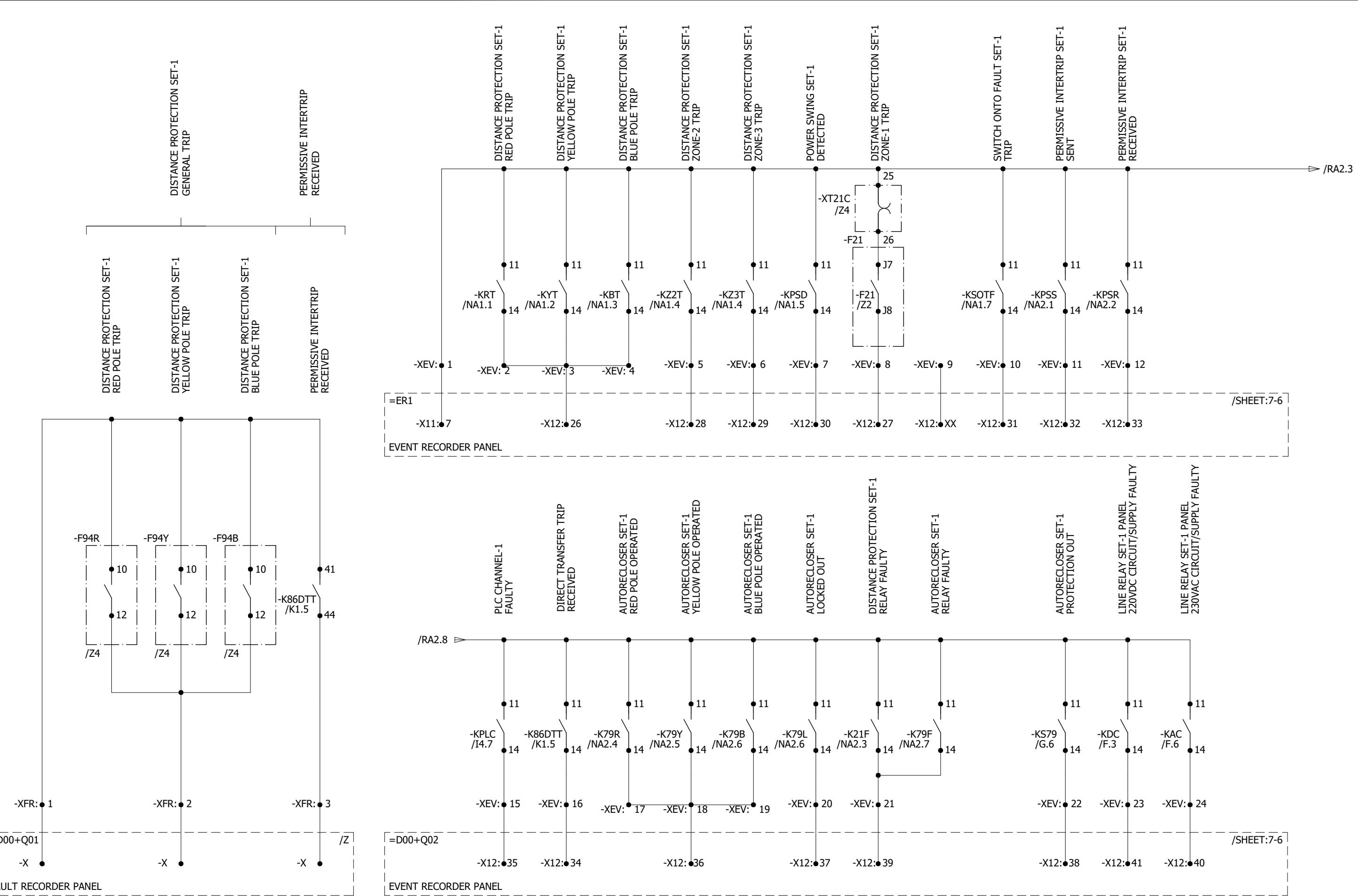
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0	AS BUILT	20.11.2018	ASJ	Manufacturer  71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV LINE RELAY SET-1 PANEL (=D02+R1) ANNUNCIATION CIRCUIT	Drawing no. P60194-E-RLC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA1	Sheet no. 24
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0	AS BUILT	20.11.2018	ASJ	Manufacturer  21-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-1 PANEL (=D02+R1) EVENT & FAULT RECORDER CIRCUITS	Drawing no. P60194-E-RLC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA2	Sheet no. 25
1	2	3	4	5	6	7	8				

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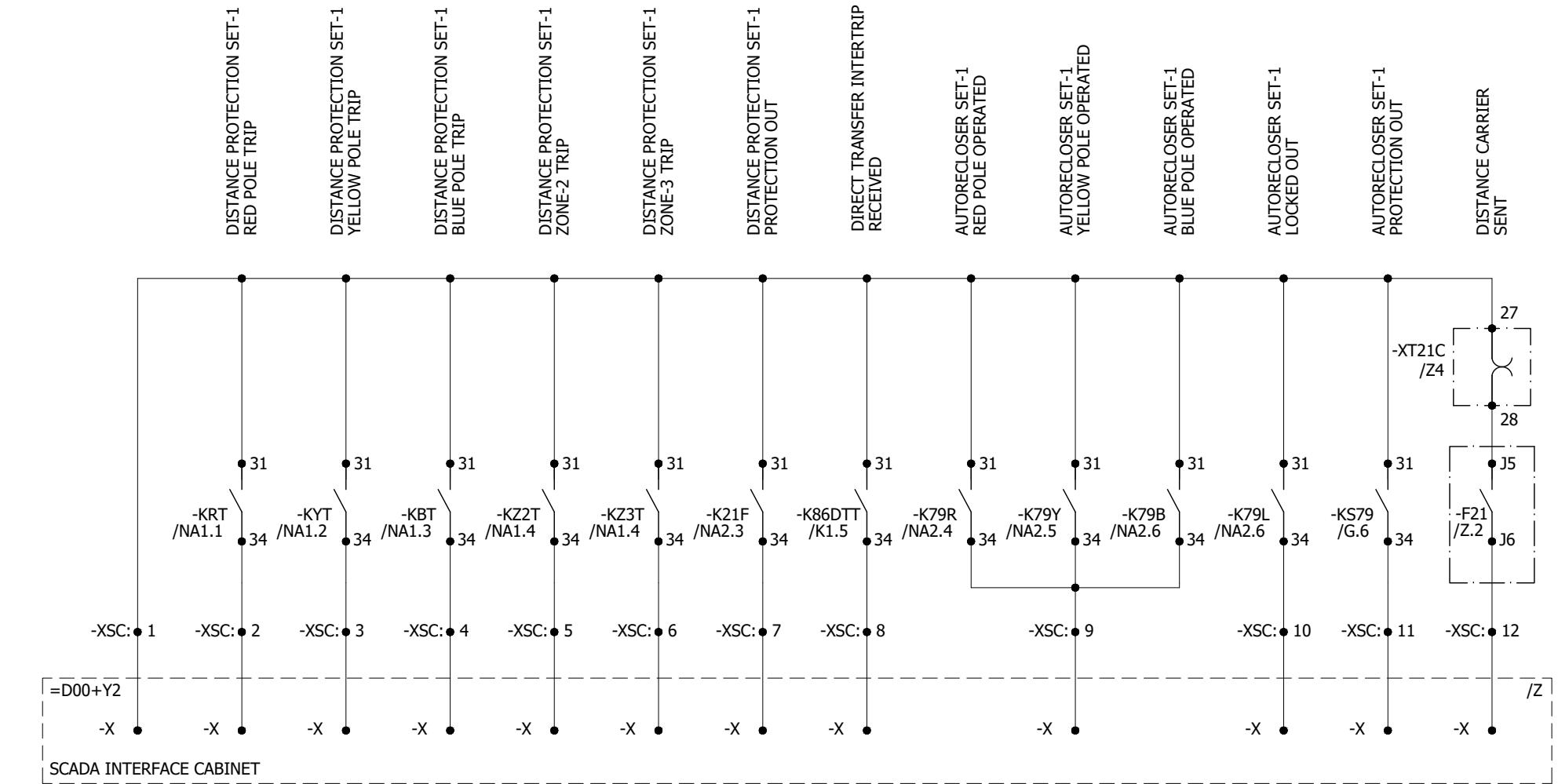
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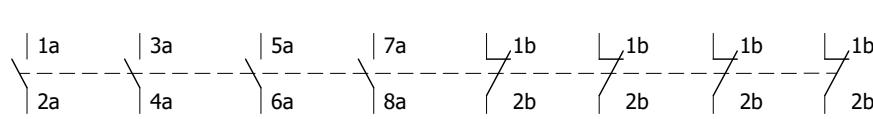
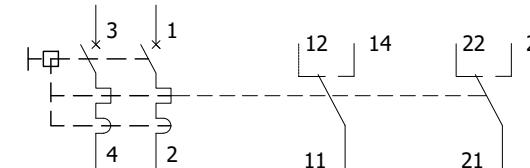
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F

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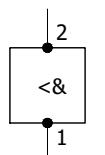
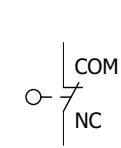


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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA3	Sheet no. 26



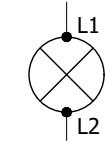
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-F102	D.4	F.6	
-F103	D.6	F.6	
-F201	E.2	F.2	
-F202	E.3	F.2	
-F203	E.4	F.2	
-F204	E.5	F.3	

-S79	G.6			I2.2		
-S80	I2.3			I2.3		



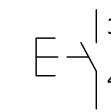
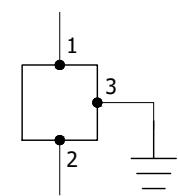
-S100	D.3
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-B100	D.4	D.5
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-H100	D.3
-H200	F.4

-R100	D.5
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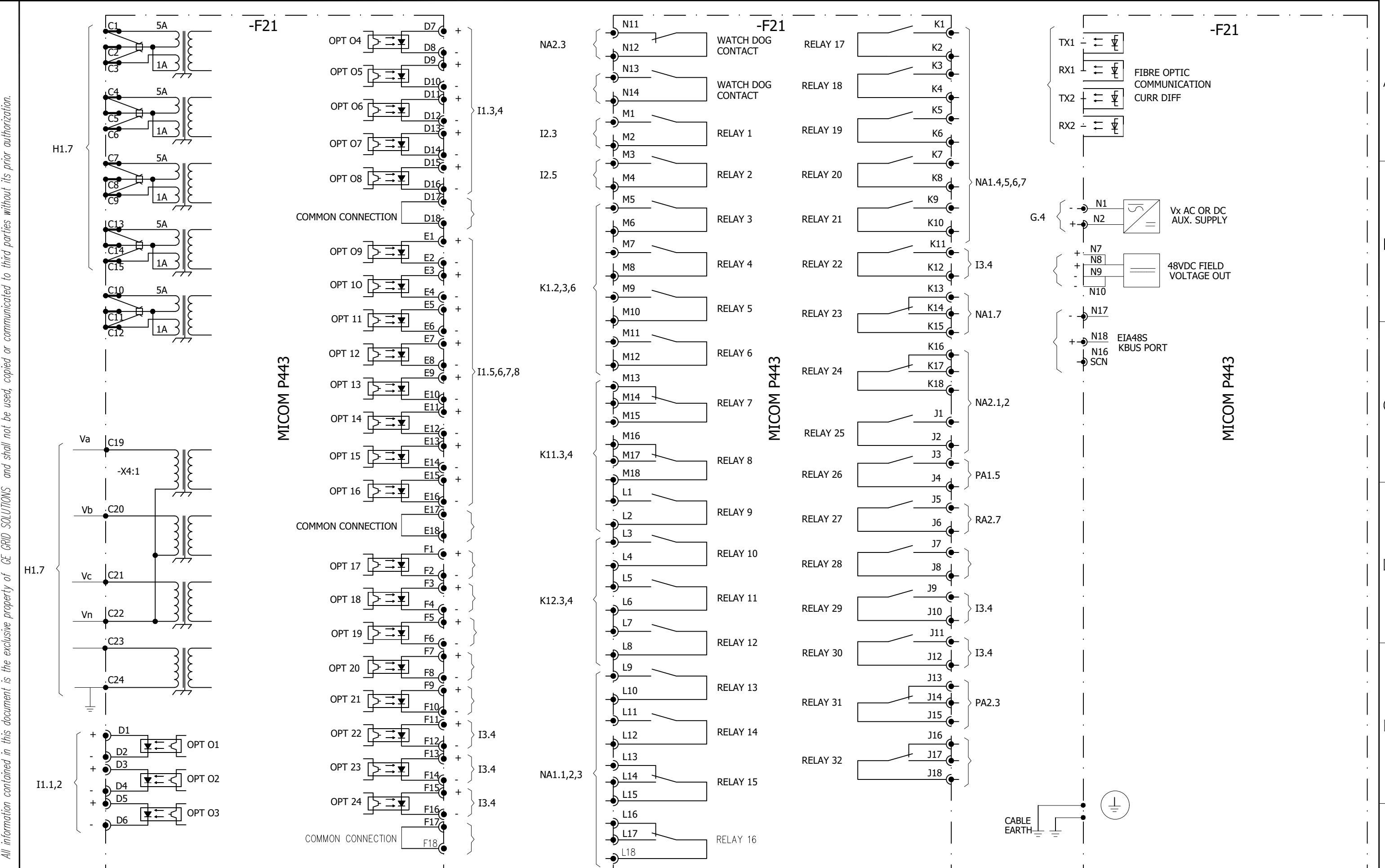


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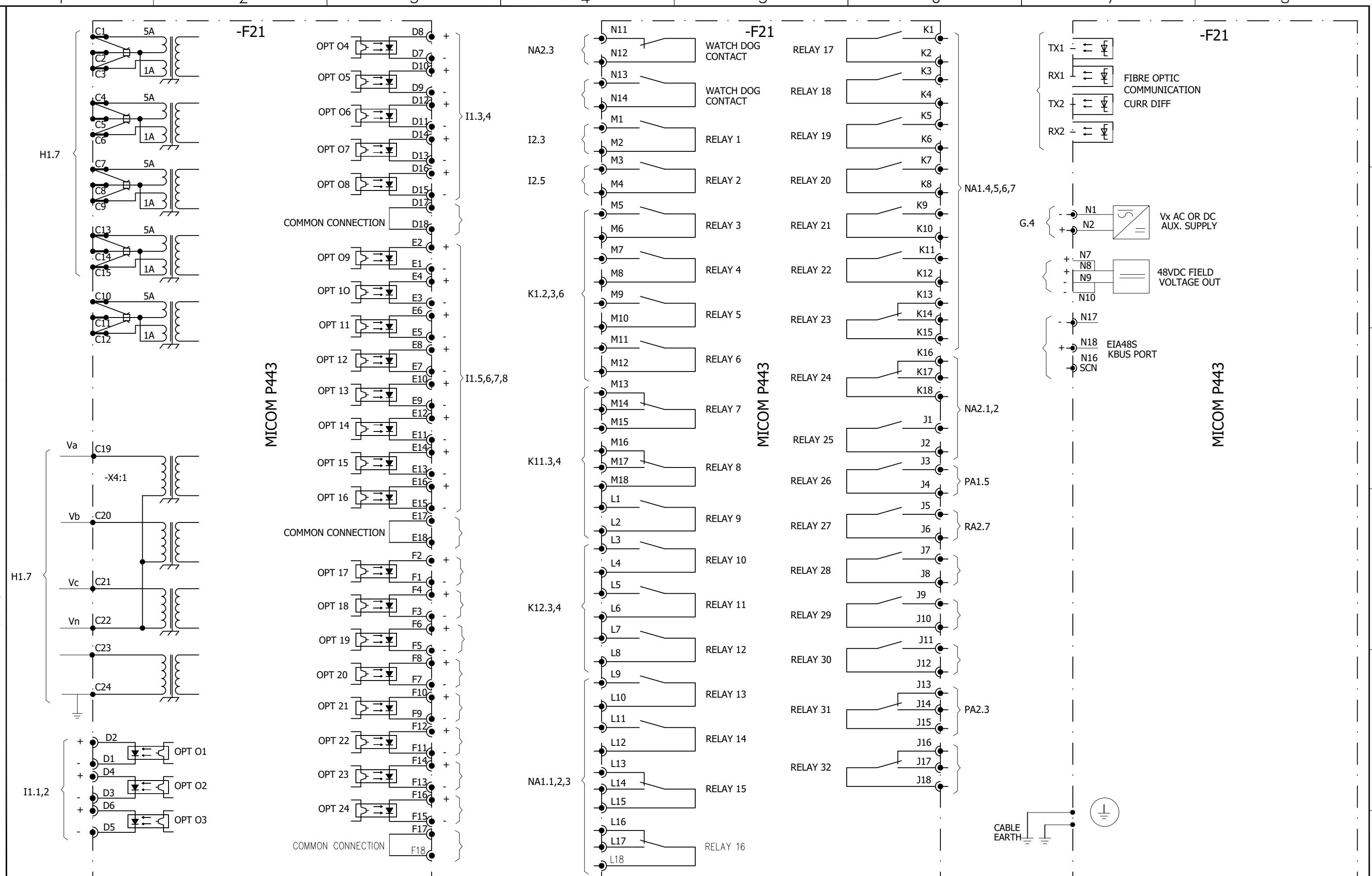
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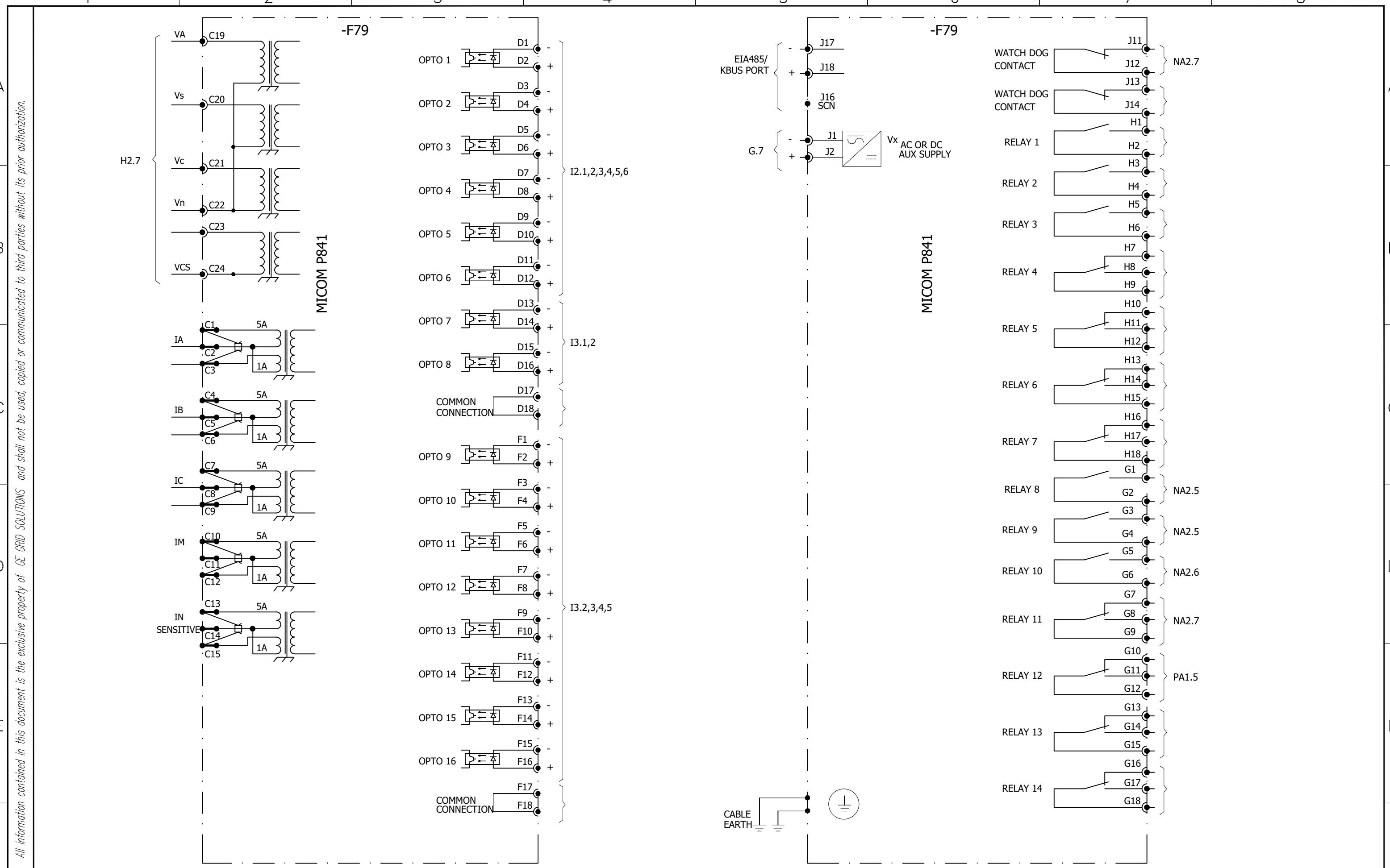
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z1	Sheet no. 27
1	2	3	4	5	6	7	8				



0	AS BUILT	20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPEOSOL 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-1 PANEL (=D02+R1) COMPONENT DIAGRAM	P-60194-E-RLC-SC-001
									Project no. P-60194 Sheet type Z2 Sheet no. 28



0	AS BUILT	20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPEOSOL 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-1 PANEL (=D02+R1) COMPONENT DIAGRAM	P-60194-E-RLC-SC-001
									Project no. P-60194 Sheet type Z2 Sheet no. 28



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-1 PANEL (=D02+R1) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z3	Sheet no. 29

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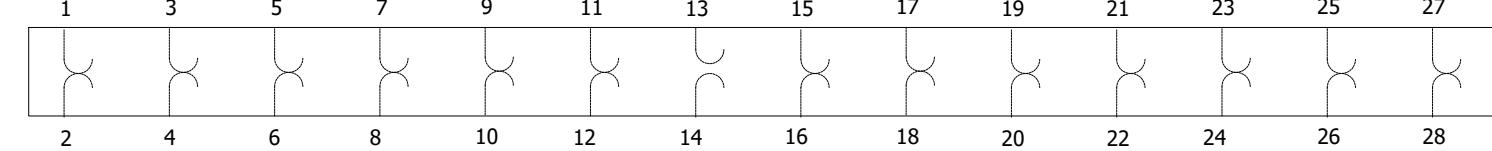
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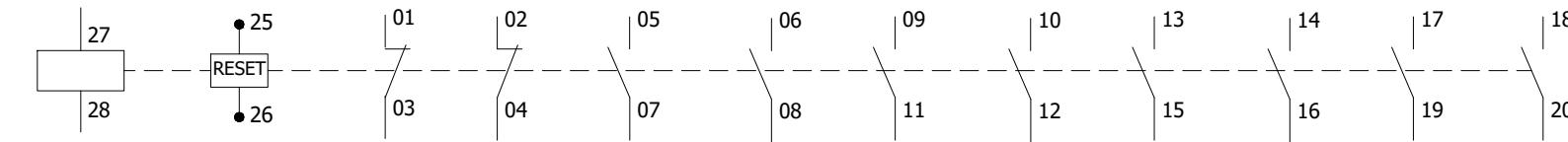
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-XT21A	H1.5	NA1.1	G.4		NA1.2	H1.5	
-XT21B	K1.2	K1.6	K11.2	K12.3	K11.3	K11.5	K12.3
-XT21C	NA1.4	NA1.6	K1.6	NA1.7	NA2.2	RA2.6	RA3.7
-XT79	H2.5		NA2.5	G.7	NA2.6		H2.5



-F94R	K1.2			PA1.3	PA2.4	PA2.6	PA2.1				
-F94Y	K1.2			PA1.3	PA2.4	PA2.6	PA2.2				
-F94B	K1.3			PA1.3	PA2.4	PA2.7	PA2.2				
-F86DTT	K1.4	G.2	PA2.2	I2.6	K11.5	K11.6	K11.6	K12.5	K12.6	K12.6	

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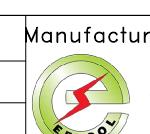
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0	AS BUILT	20.11.2018	ASJ	Manufacturer  EPESOL 21-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV LINE RELAY SET-1 PANEL (=D02+R1) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type Z4
									Sheet no. 30

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