



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

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

## 220kV LINE RELAY SET-1 PANEL (=D08+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				
 <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							
220kV LINE RELAY SET-1 PANEL (=D08+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	
A	01	A	Cover Sheet			X							
	02	AA	List Of Contents			X							
	03	AB	Symbols and Legends			X							
	04	AC	Component List			X							
	05	AD	Panel View			X							
B	06	AE	Bay Concept & Protection Logics			X							
	07	D	AC Supply Distribution Circuit			X							
	08	E	DC Supply Distribution Circuit			X							
	09	F	AC/DC Supply Failure Circuits			X							
	10	G	Relay Control & Supply Circuits			X							
C	11	H1	Distance Relay Protection CT/VT Circuit			X							
	12	H2	Autorecloser VT Input Circuit			X							
	13	I1	Distance Relay input Circuit			X							
	14	I2	Auto Recloser Input Circuit			X							
	15	I3	Auto Recloser Input Circuit			X							
	16	I4	System Input Circuit			X							
D	17	K1	Protection Trips Circuit			X							
	18	K2	Trip Circuit for Coil-1			X							
	19	K3	Trip Circuit for Coil-2			X							
	20	NA1	System Alarm Circuits			X							
	21	NA2	System Alarm Circuits			X							
	22	PA1	Protection Circuits			X							
	23	PA2	Protection Circuits			X							
	24	RA1	CP Annunciation Circuit			X							
E	25	RA2	Event & Fault Recorder Circuit			X							
	26	RA3	SCADA Circuit			X							
	27	Z1	Component Diagram			X							
	28	Z2	Component Diagram			X							
	29	Z3	Component Diagram			X							
F	30	Z4	Component Diagram			X							
0	AS BUILT	20.11.2018	ASJ	Manufacturer  EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  GE Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV LINE RELAY SET-1 PANEL (=D08+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	

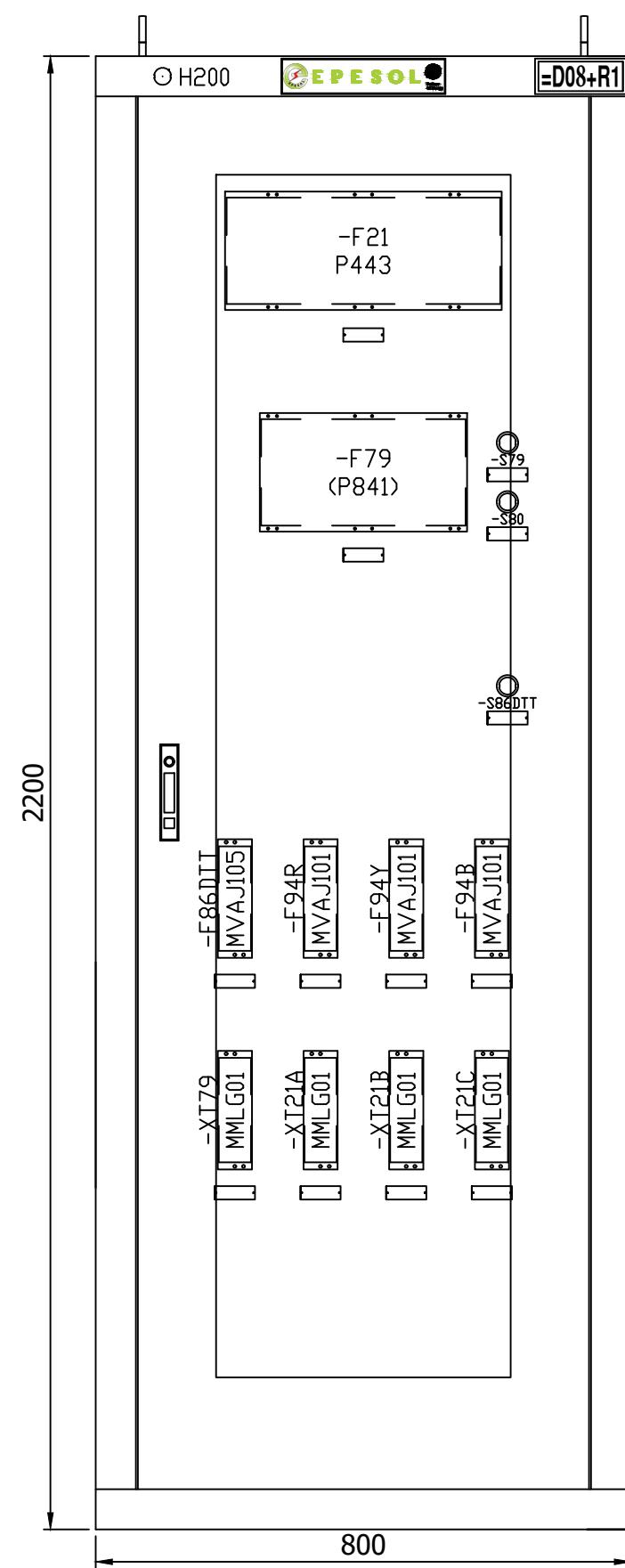
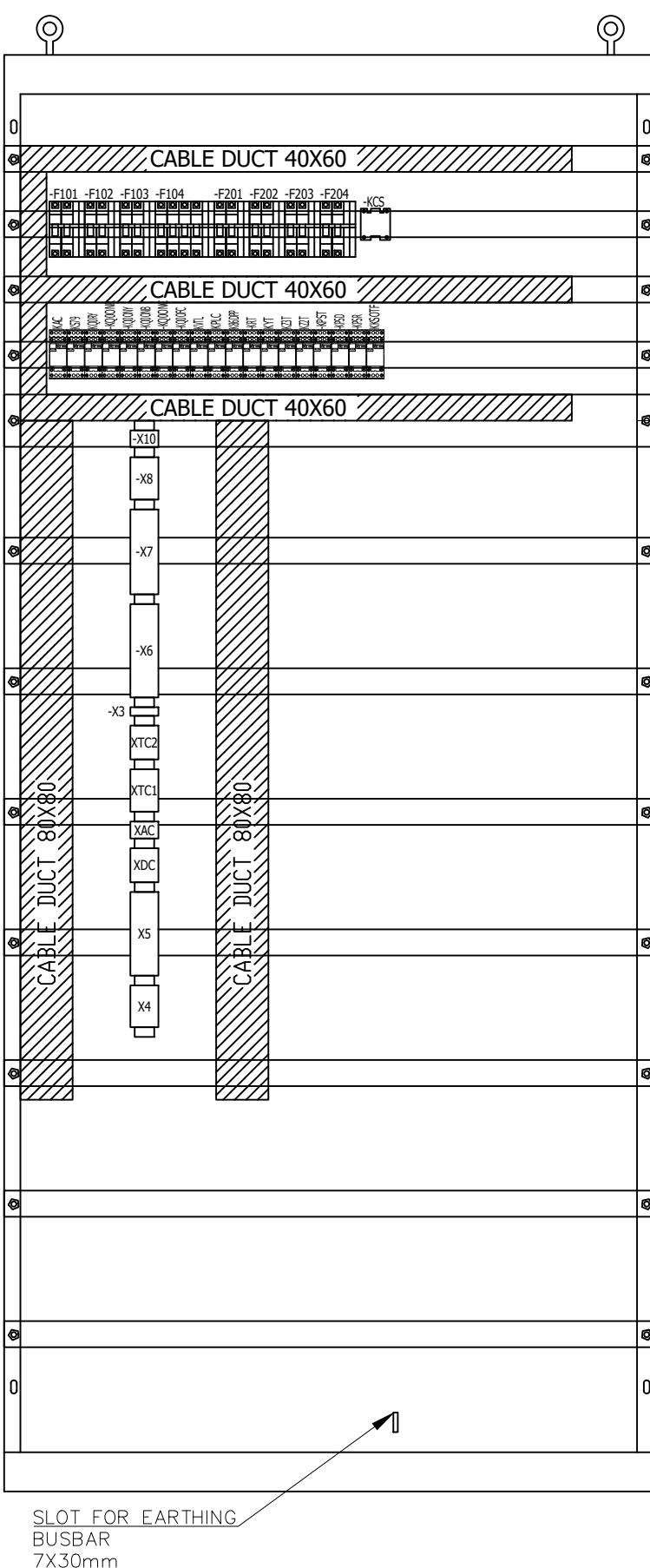
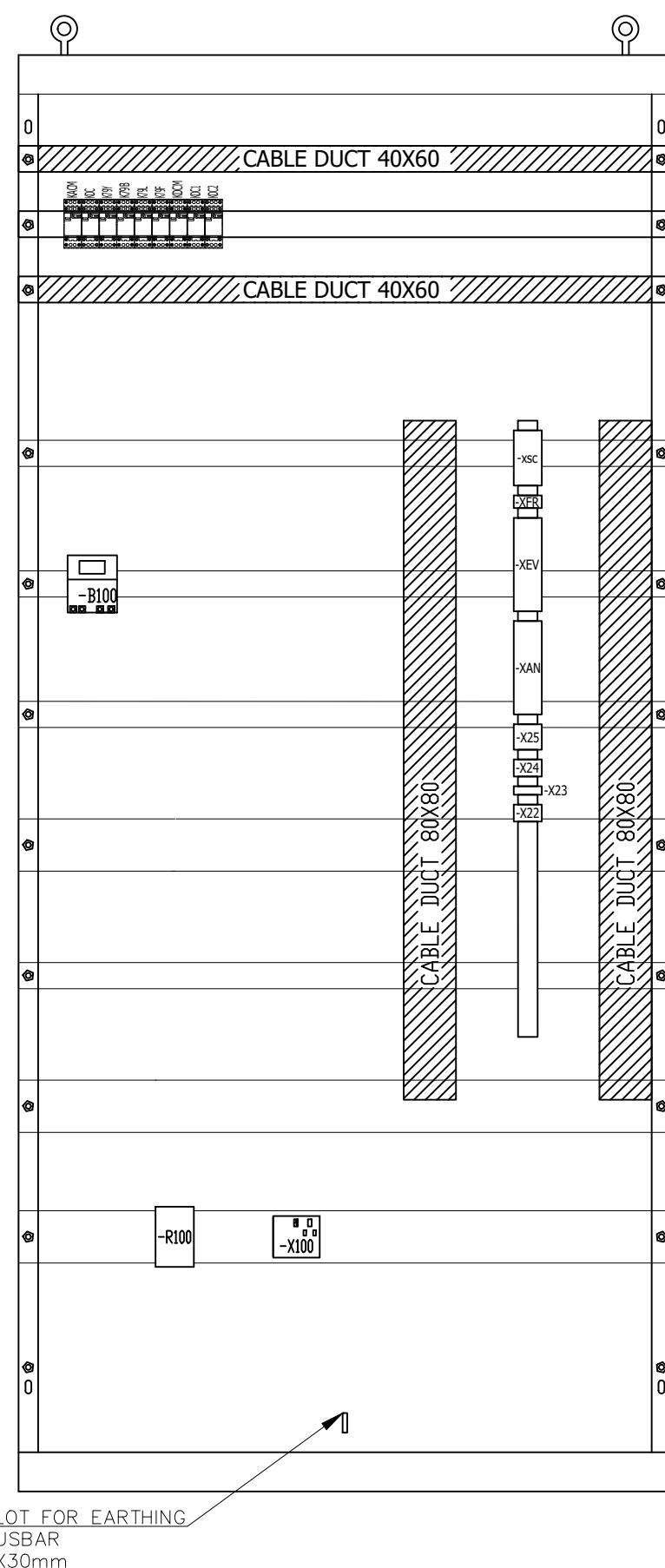
	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A		CIRCUIT BREAKER		MINIATURE CIRCUIT BREAKER		AUXILIARY CONTACTOR NO+NC	21	DISTANCE
B		SWITCH/ISOLATOR		KEY OPERATED SELECTOR SWITCH		AMMETER	24	OVEREXCITATION
C		EARTHING		LIMITED SWITCH		VOLTMETER	25	SYNCHROCHECK
D		SF6 TO 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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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 (=D08+R1) SYMBOLA AND LEGENDS	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AB
									Sheet no. 03

	1	2	3	4	5	6	7	8			
A	QTY.	DEVICE DESCRIPTION		DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION		MANUFACTURER		
	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		
B	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		
C	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		
D	02	CONTROL MCB - PANEL LIGHT & HEATER		G62C02+CAH(2), 2-Pole, Ratings: 2A, 230VAC, 6kA @ 230VAC, 2 CO Contacts			-F101-102		GE GRID SOLUTIONS		
	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		
E	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		
F	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.		
G	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.		
	30	AUXILIARY CONTACTOR		PRC4M40DCML, Coil Voltage: 220VDC, 4 CO Contacts			-KAC,-KS79,-KQ0.RY/ONR/ONY/OYB/ONC/OFC,-KVTL,-KPLC		GE GRID SOLUTIONS		
H							-K86DTT,-KRT/YT/BT/Z2T/Z3T,-KPSD/T,-KSOTF,-KPR/S,				
							-K21F,-K79R/Y/B/L/F,KDCM,-KDC1/2				
I	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		
J	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.		
K	01	THREE PIN SOCKET		1N+PE, 16A, 230VAC @ 50Hz			-X100		LEAR		
	01	PANEL HEATER		230VAC @ 50Hz, 50W			-R100		E-LABS		
L	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		
M	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  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 (=D08+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  <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 (=D08+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 VIEWLEFT SIDE VIEWRIGHT SIDE VIEW

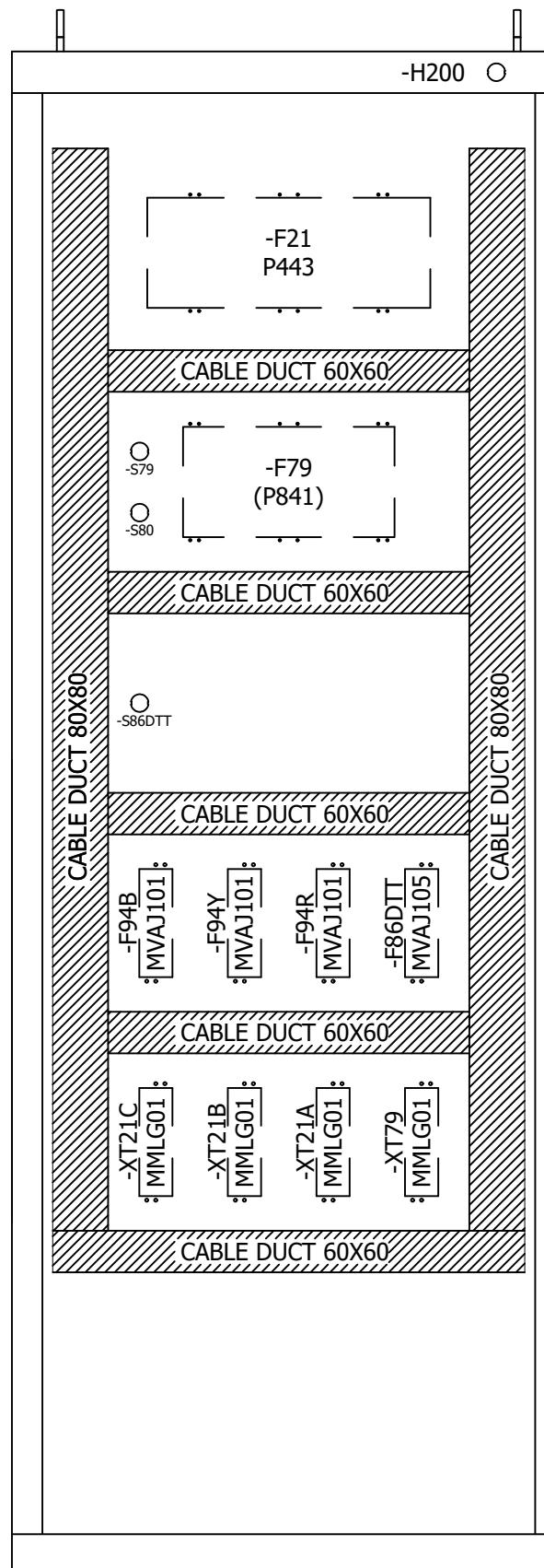
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A  
B  
C  
D  
E  
F

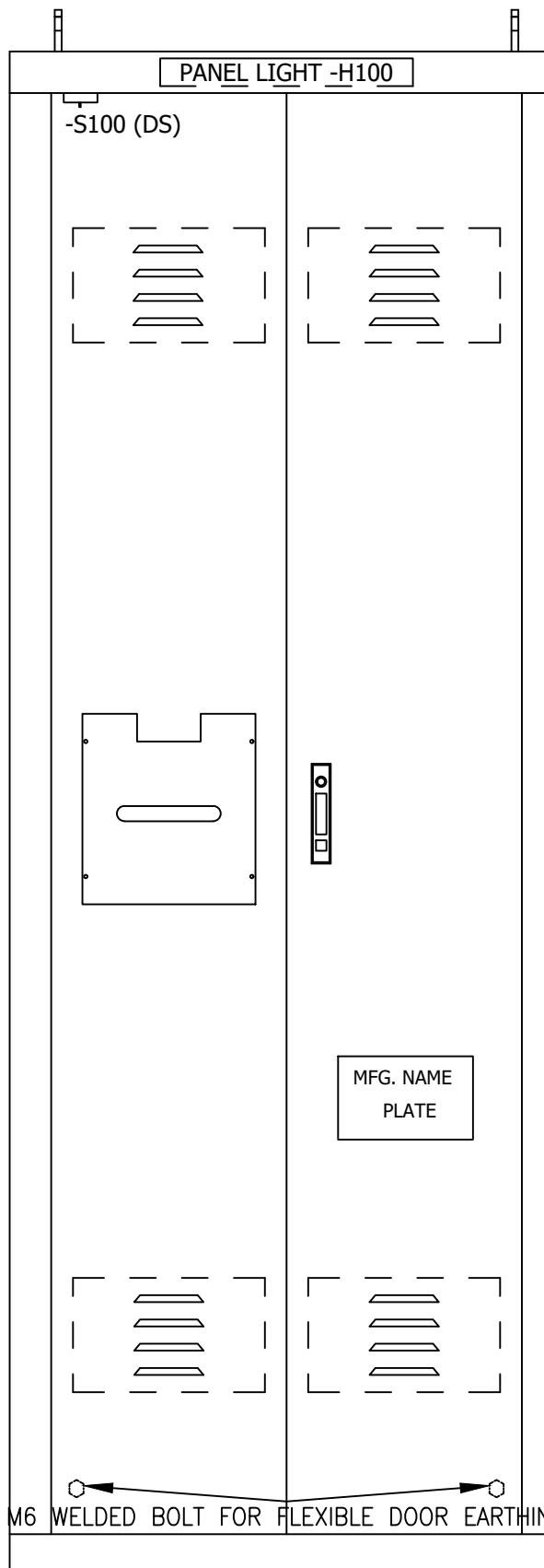
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REV.	DESCRIPTION	DATE	DRAWER	EPESOL 7-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	P-60194-E-RLC-SC-001	Project no. P-60194	Sheet type AD	Sheet no. 05

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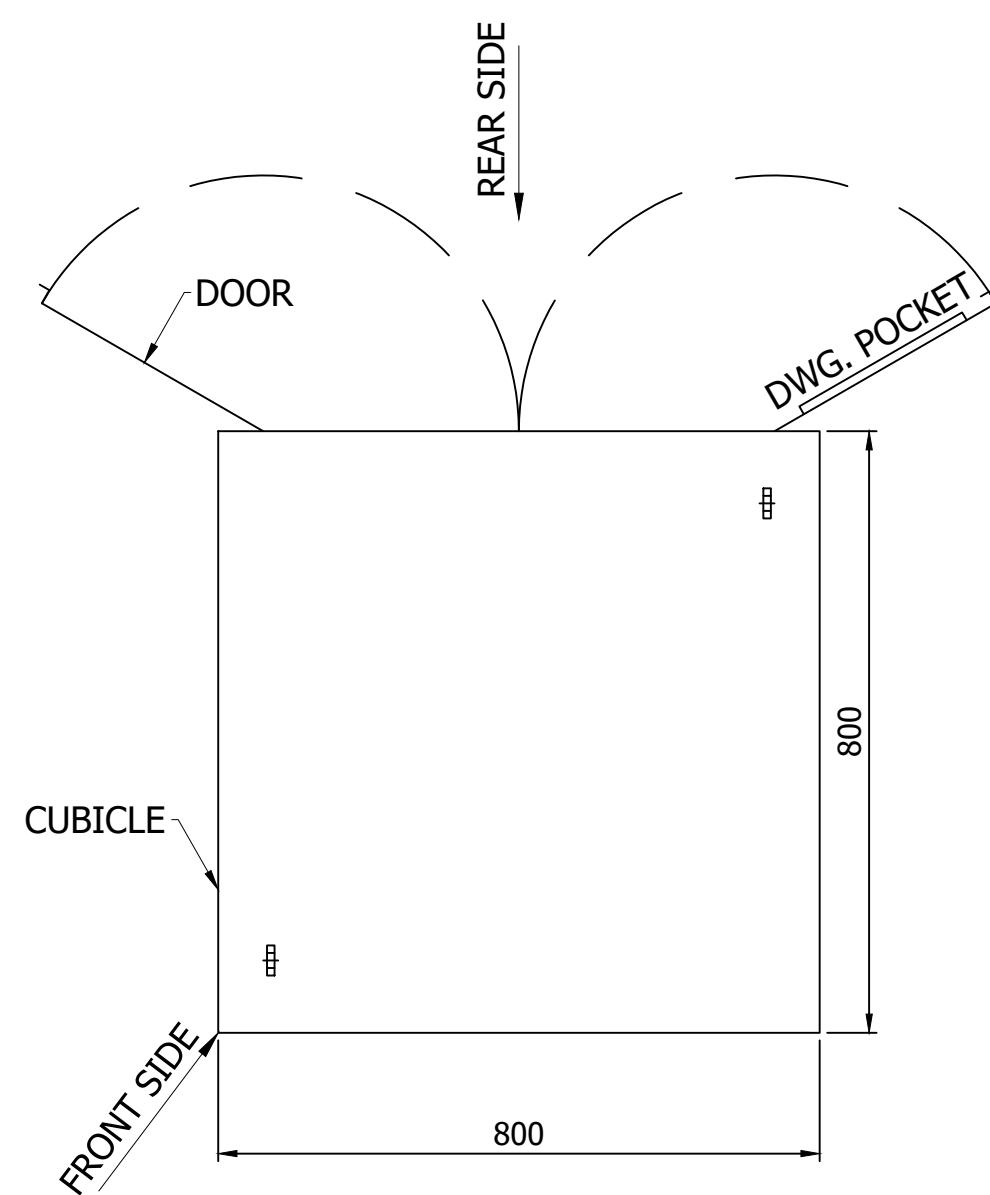
## BACK VIEW WITHOUT DOOR



## BACK VIEW WITH DOOR



TOP VIEW



### **NOTE:-**

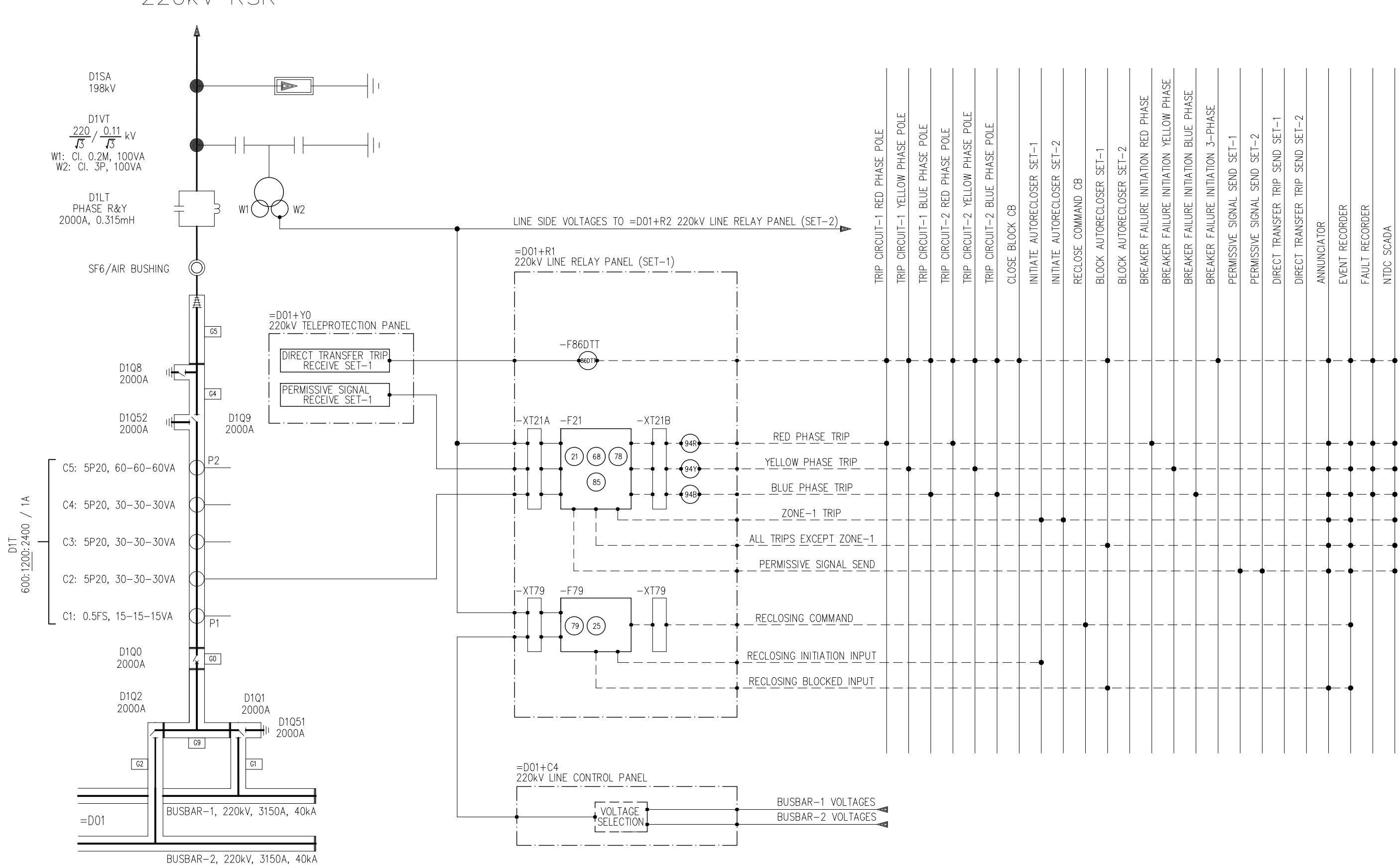
- 1 - PANEL DIMENSION: 800 x 1000 x 2200mm (WxDxH)
  - 2 - COLOR : RAL 7032
  - 3 - SHEET THICKNESS : 2 - 2.5 mm
  - 4 - PROTECTION CLASS : IP-51 (INDOOR TYPE)
  - 5 - ALL DOOR FITTED WITH 16mm EARTH STRAP & INSULATED WITH GREEN-YELLOW COLOUR.

0	AS BUILT	20.11.2018	ASJ	<b>Manufacturer</b>  <b>EPESOL</b> 7-B Garden Block, New Garden Town, Lahore, Pakistan	<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>GHAZI ROAD, LAHORE</b>	<b>Title</b> <b>220kV LINE RELAY SET-1 PANEL</b> <small>(=D08+R1)</small> <b>PANEL VIEW</b>	<b>Drawing no.</b> <b>P60194-E-RLC-SC-001</b>		
REV.	DESCRIPTION	DATE	DRAWER						<b>Project no.</b> <b>P-60194</b>	<b>Sheet type</b> <b>AD1</b>	<b>Sheet no.</b> <b>05a</b>

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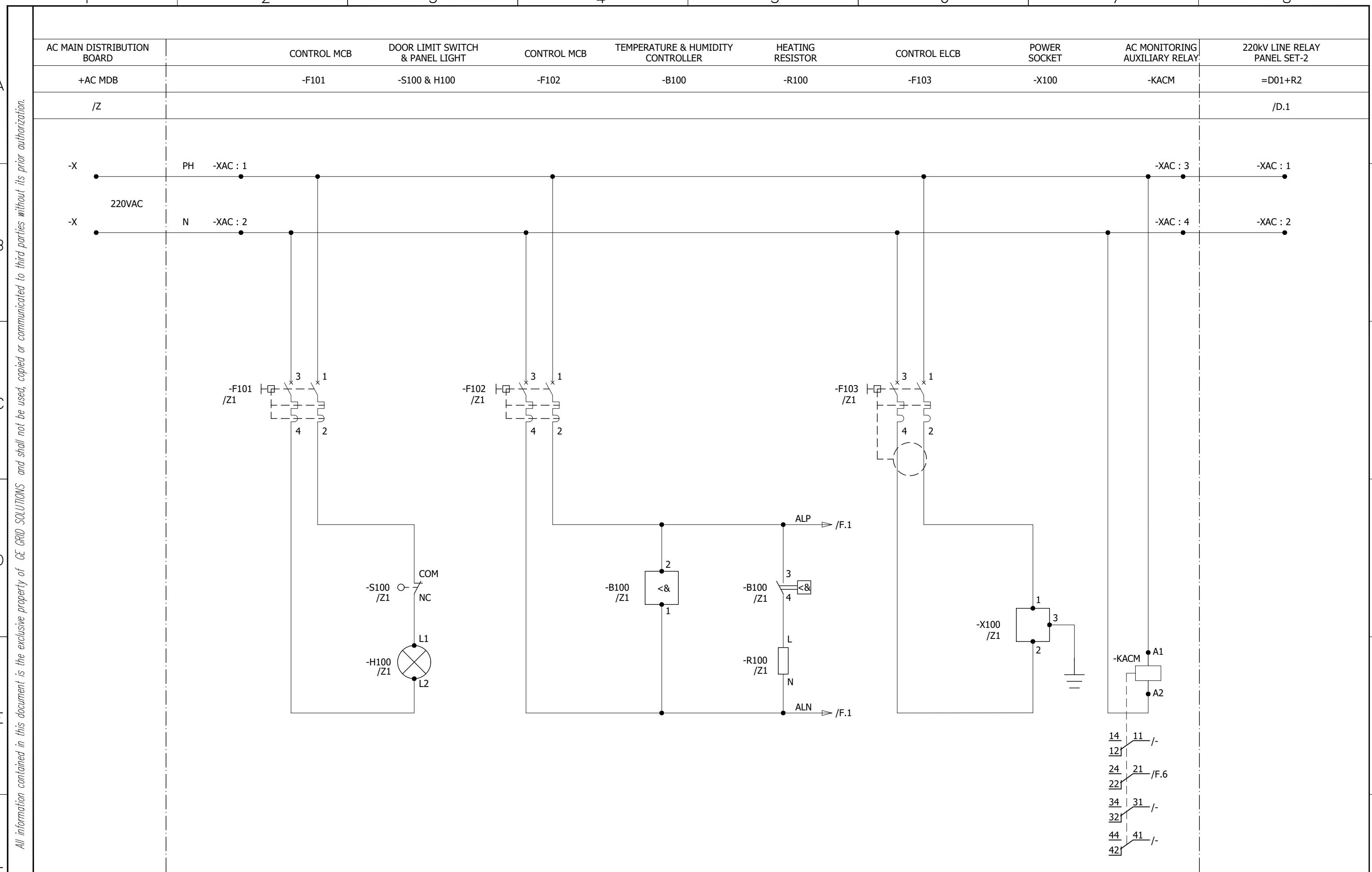
## 220kV KSK

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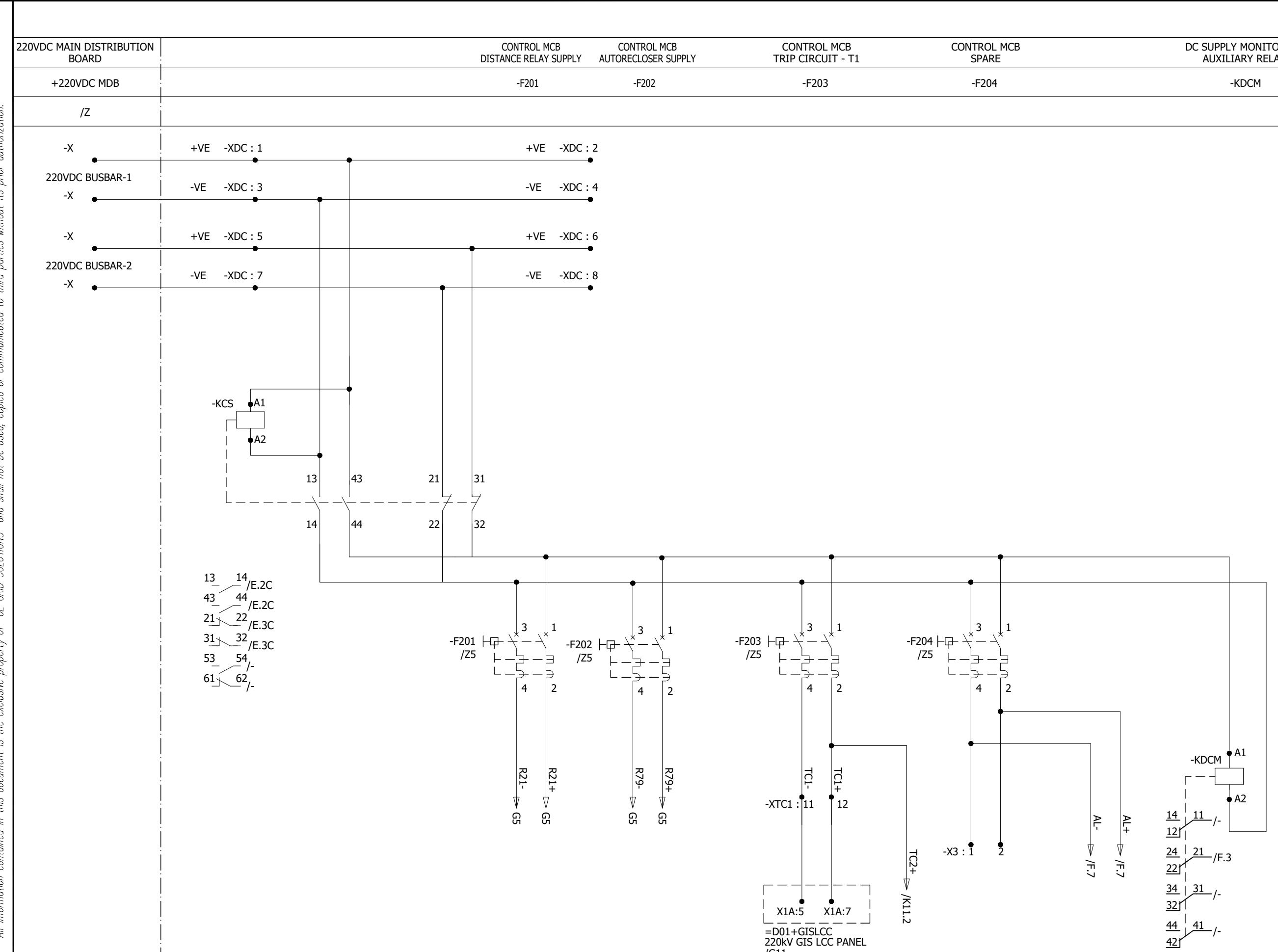
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AE
									Sheet no. 06

1 2 3 4 5 6 7 8



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REV.	DESCRIPTION		DATE	DRAWER					Project no. P-60194	Sheet type D	Sheet no. 07
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 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 (=D08+R1) DC SUPPLY DISTRIBUTION	P60194-E-RLC-SC-001		
										Project no. P-60194	Sheet type E	Sheet no. 08
1			2		3	4	5	6	7	8		

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## 220V DC CIRCUIT FAULTY

## 220V DC CIRCUIT FAULTY INDICATION

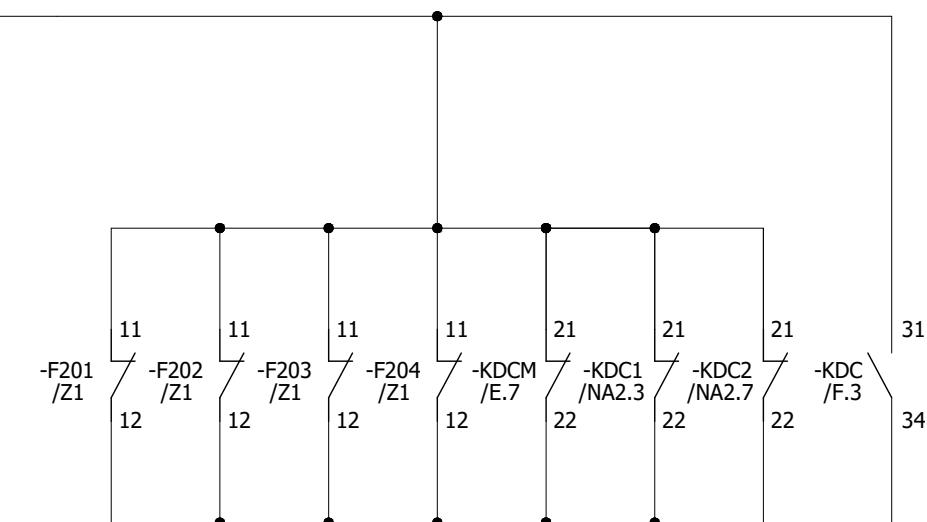
## 220V AC CIRCUIT FAULTY

-KDC

-H200

-KAC

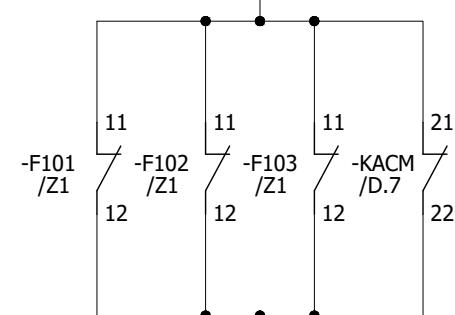
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31

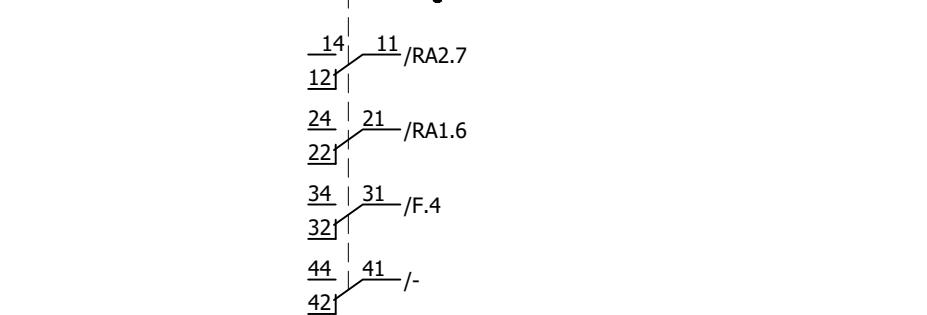
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/E.5 ➔ AL+



21

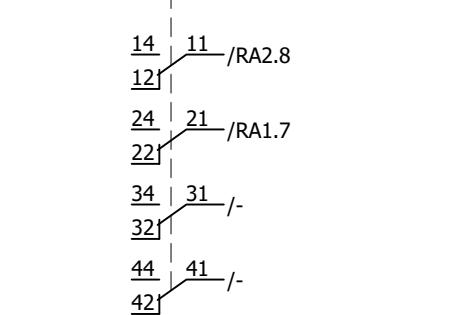
/D.5 ➔ ALN



L1

L2

/E.5 ➔ AL-



14

11/RA2.8

24

21/RA1.7

22

34

31/-

32

44

41/-

42

A

A

B

B

C

C

D

D

E

E

F

F

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  
 (=D08+R1)  
 AC/DC SUPPLY FAILURE CIRCUIT
 

Drawing no.

P60194-E-RLC-SC-001

Project no.

P-60194

Sheet type

F

Sheet no.

09

REV.

DESCRIPTION

DATE

DRAWER

1

2

3

4

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6

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8

RESET PUSHBUTTON  
DIRECT TRANSFER TRIP RELAY

-S86DTT

DISTANCE PROTECTION

RELAY SUPPLY

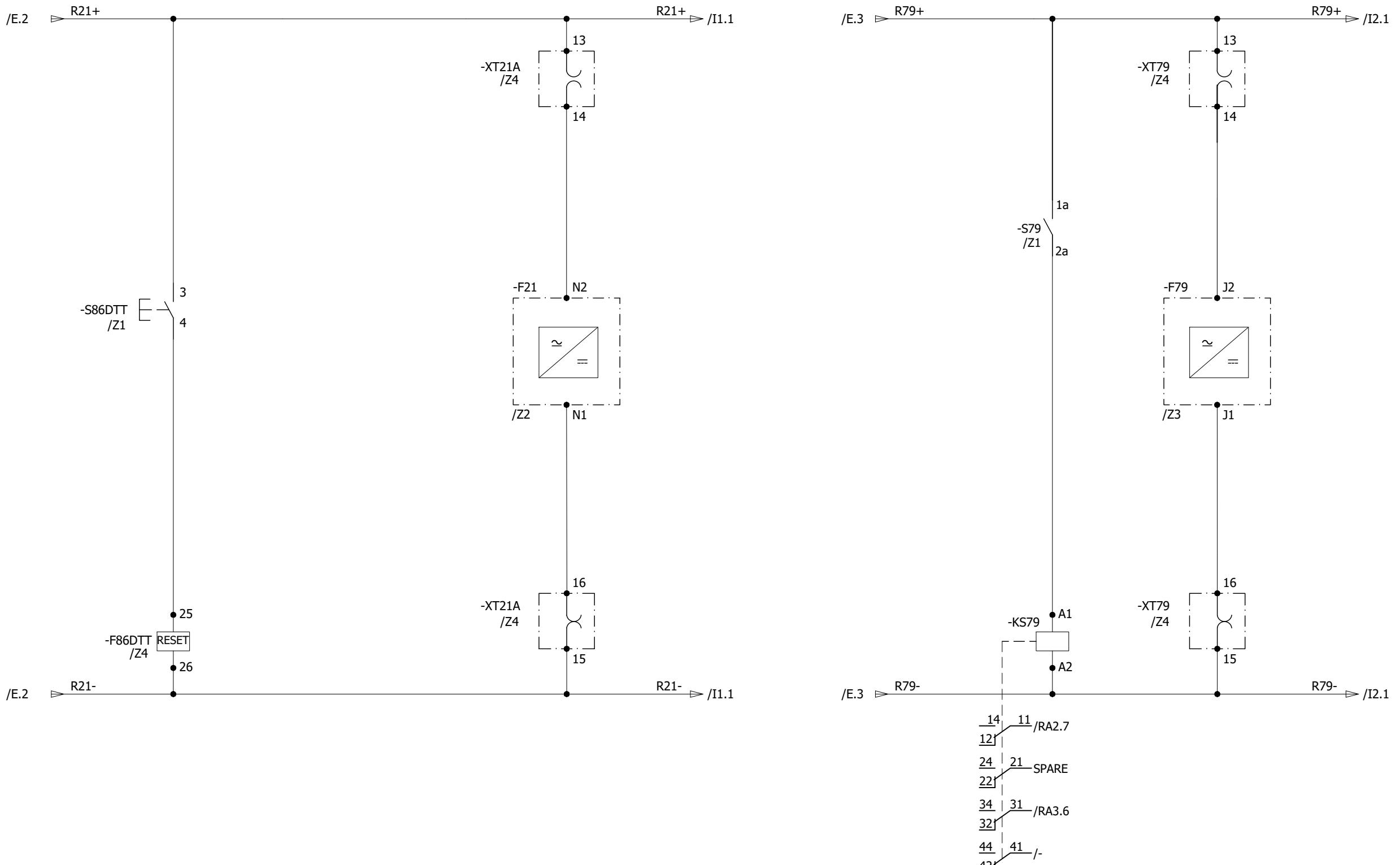
AUTO RECLOSER

AUTO RECLOSER

IN/OUT

RELAY SUPPLY

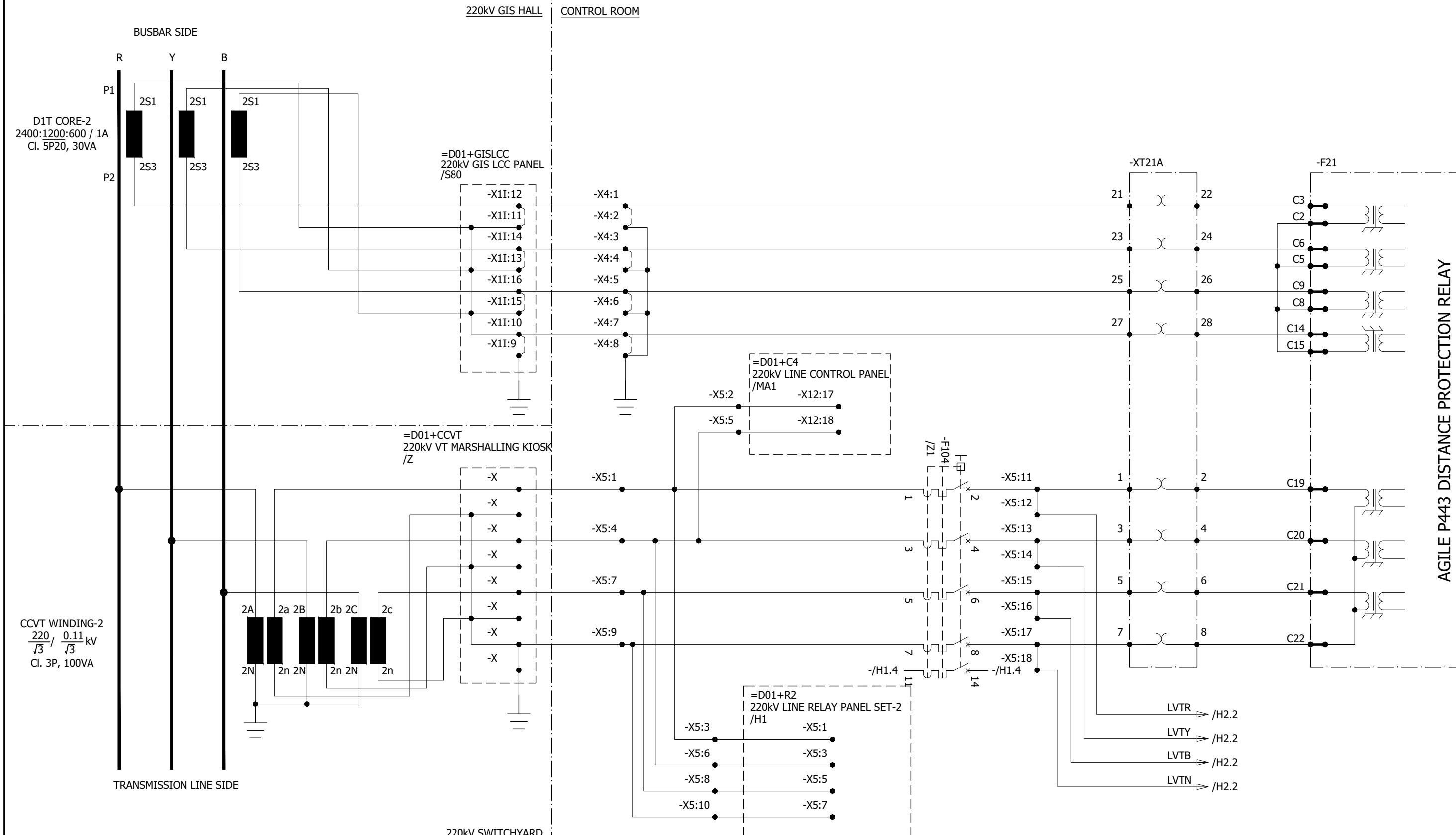
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REV.	DESCRIPTION	DATE	DRAWER	EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-1 PANEL (=D08+R1) RELAY CONTROL & SUPPLY	P60194-E-RLC-SC-001
									Project no. P-60194 Sheet type G Sheet no. 10

TEST BLOCK DISTANCE PROTECTION  
RELAY  
-XT21A -F21  
/Z4 /Z4

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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-1 PANEL (=D08+R1) DISTANCE PROTECTION CT/VT CIRCUIT	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type H1
									Sheet no. 11

220KV LINE CONTROL  
PANEL

=D01+C4

/MA1

TEST BLOCK

AUTORECLOSER  
RELAY

-XT79

-F79

/Z4

/Z4

-X12:33

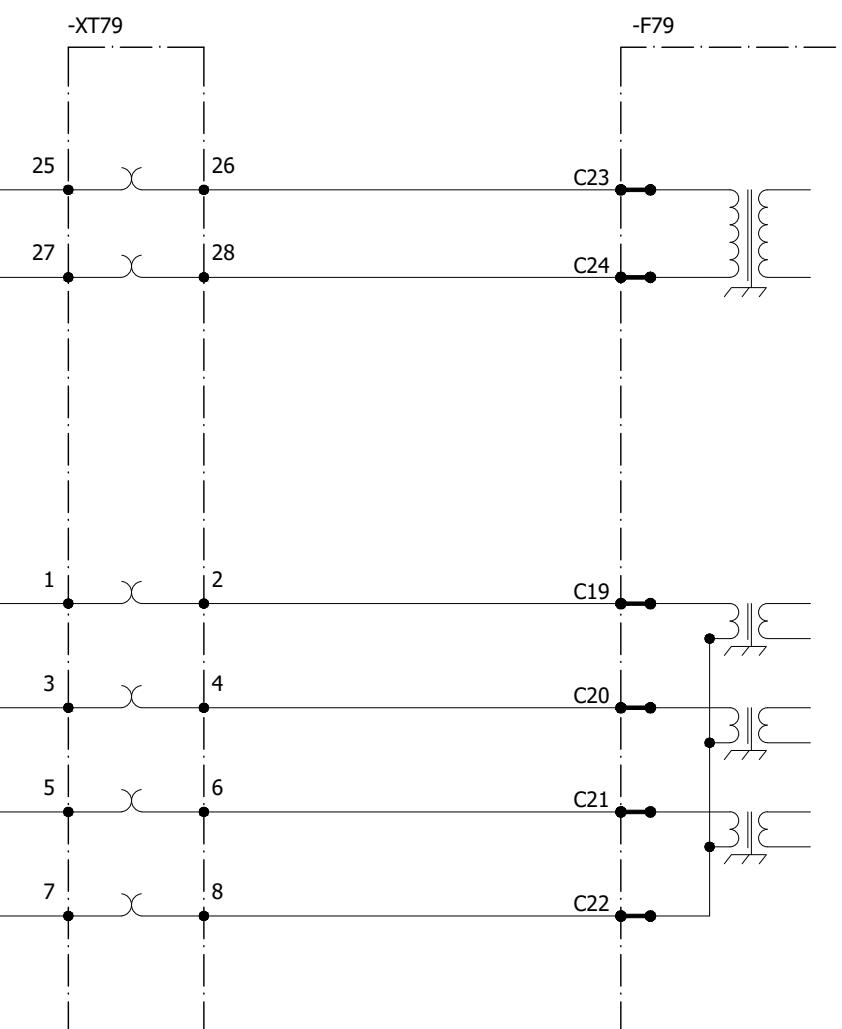
CSR

-X5:19

-X12:34

CSY

-X5:20



/H1.7 ▷ LVTR

/H1.7 ▷ LVTY

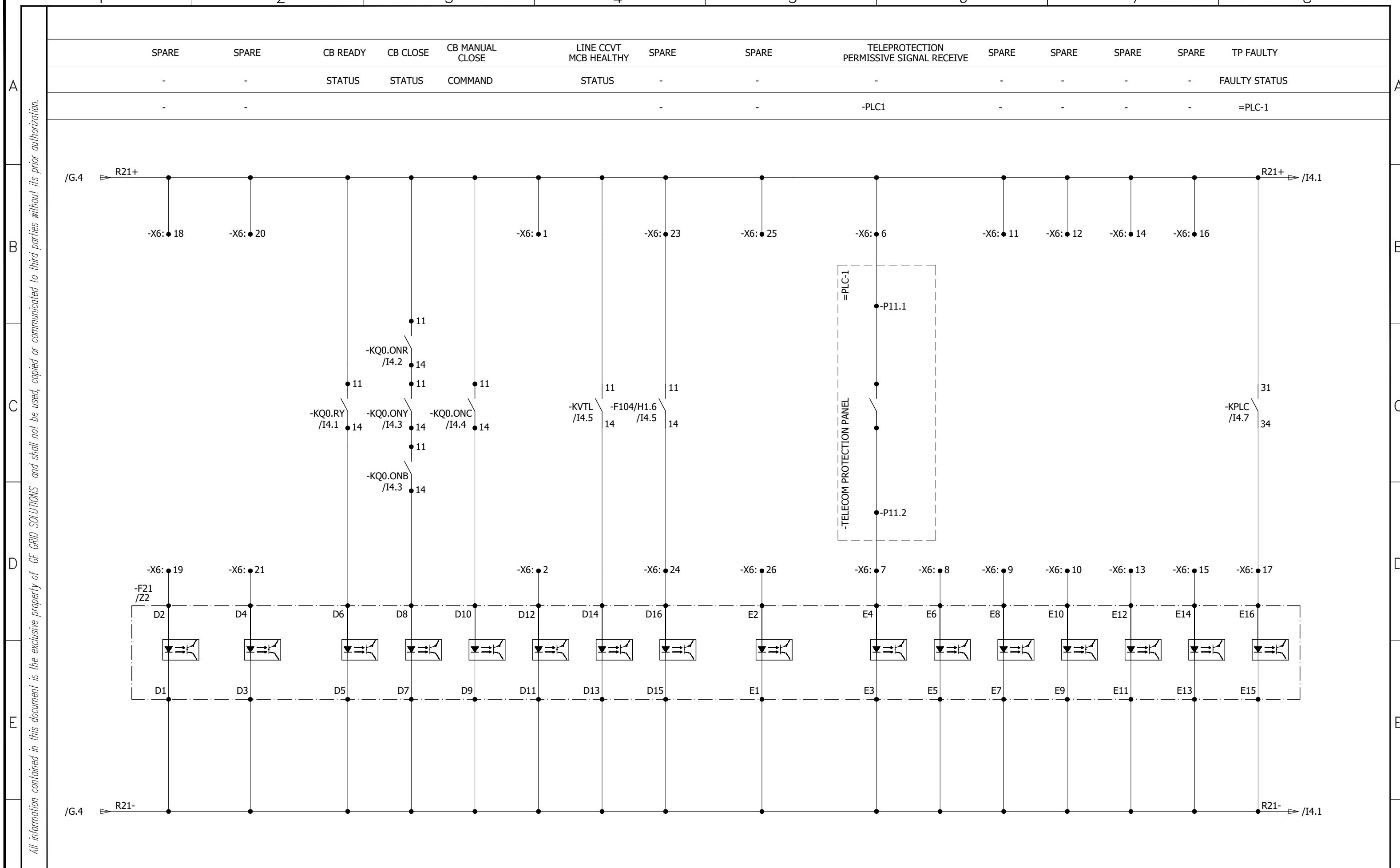
/H1.7 ▷ LVTB

/H1.7 ▷ LVTN

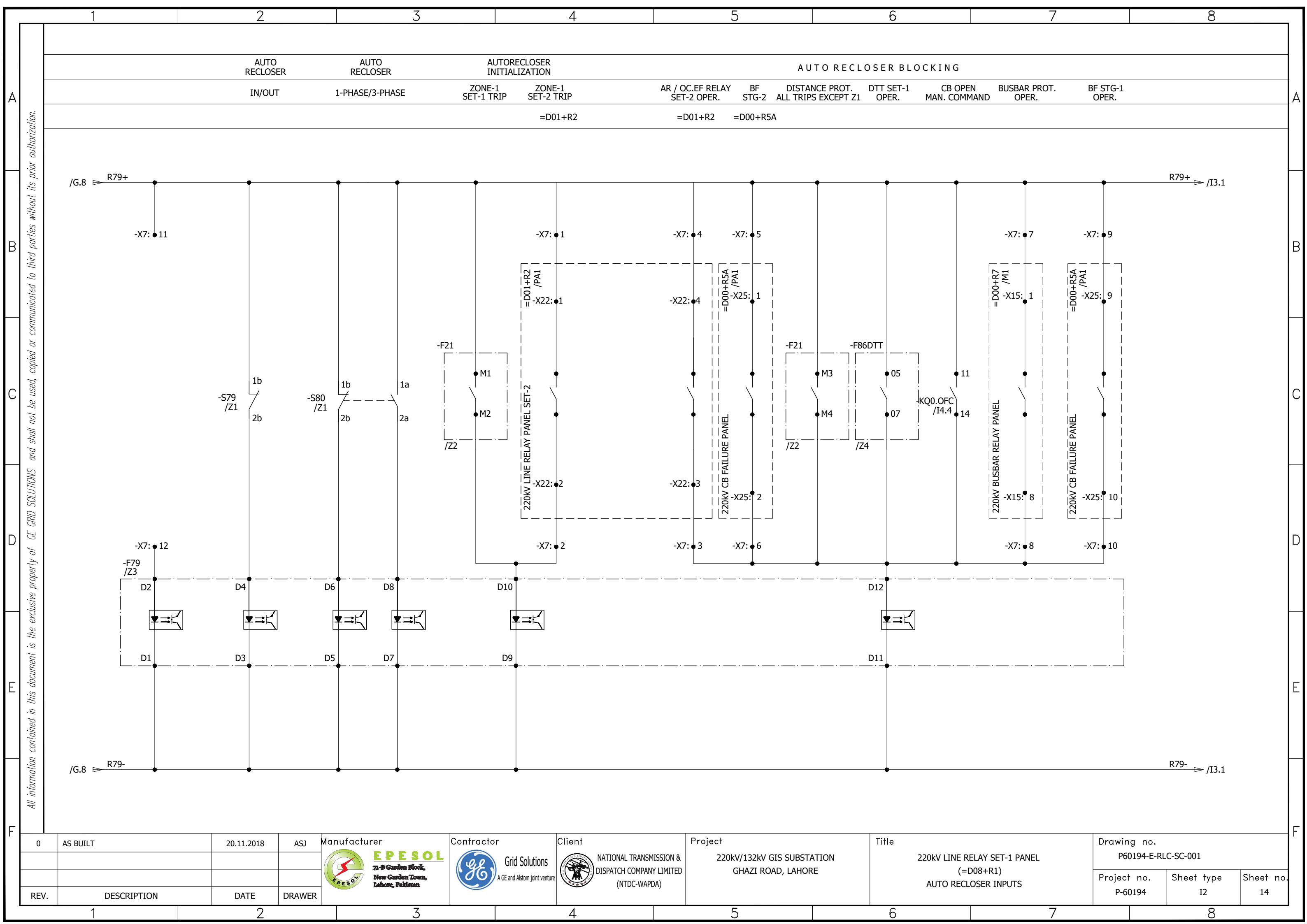
AGILE P841 AUTORECLOSER RELAY

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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 (=D08+R1) AUTORECLOSER VT INPUTS	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194      Sheet type H2      Sheet no. 12

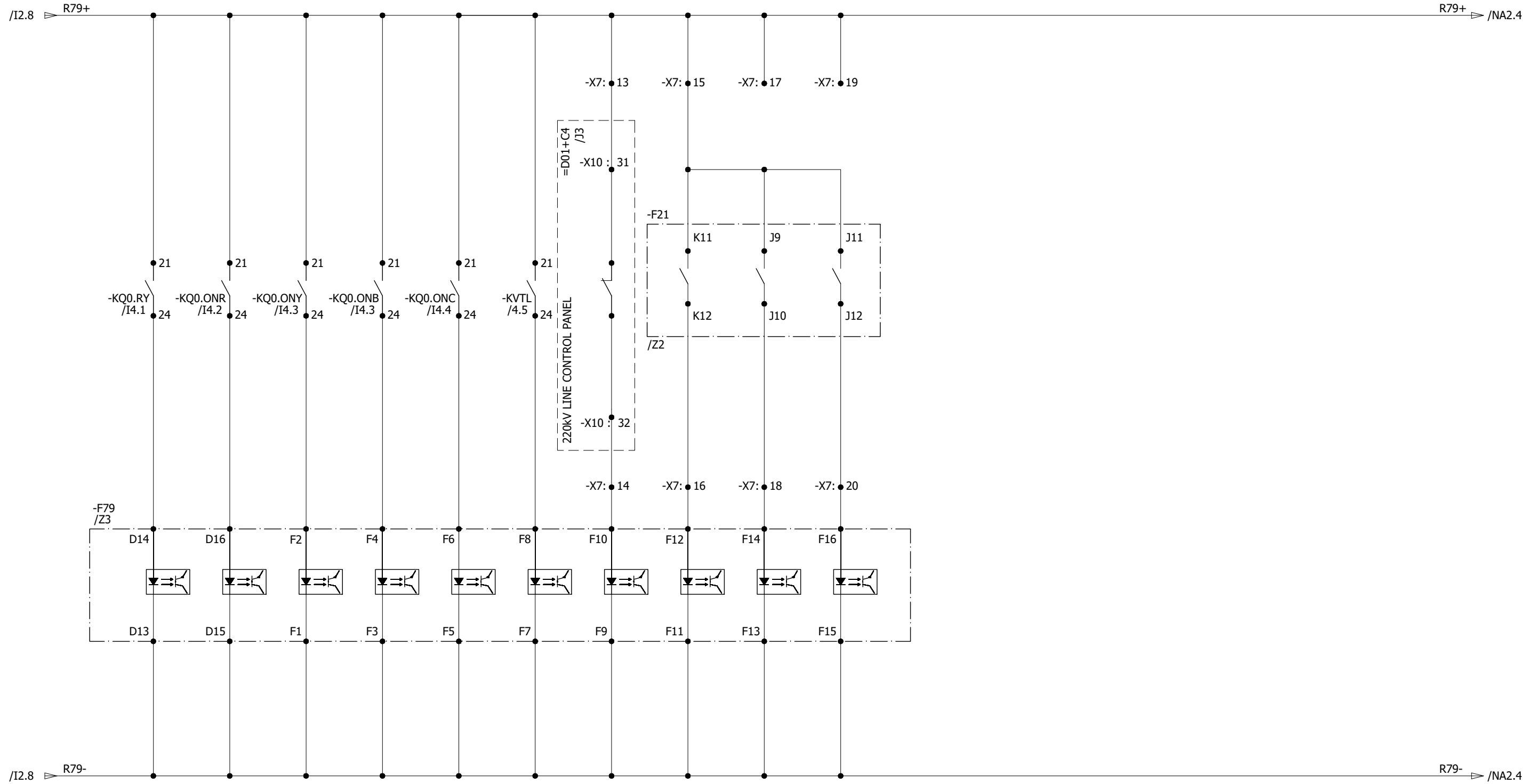


0	AS BUILT		20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.			
REV.	DESCRIPTION		DATE	DRAWER	EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-1 PANEL (=D08+R1) DISTANCE RELAY INPUTS	P-60194-E-RLC-SC-001	Project no.	Sheet type	Sheet no.
										P-60194	I1	13	

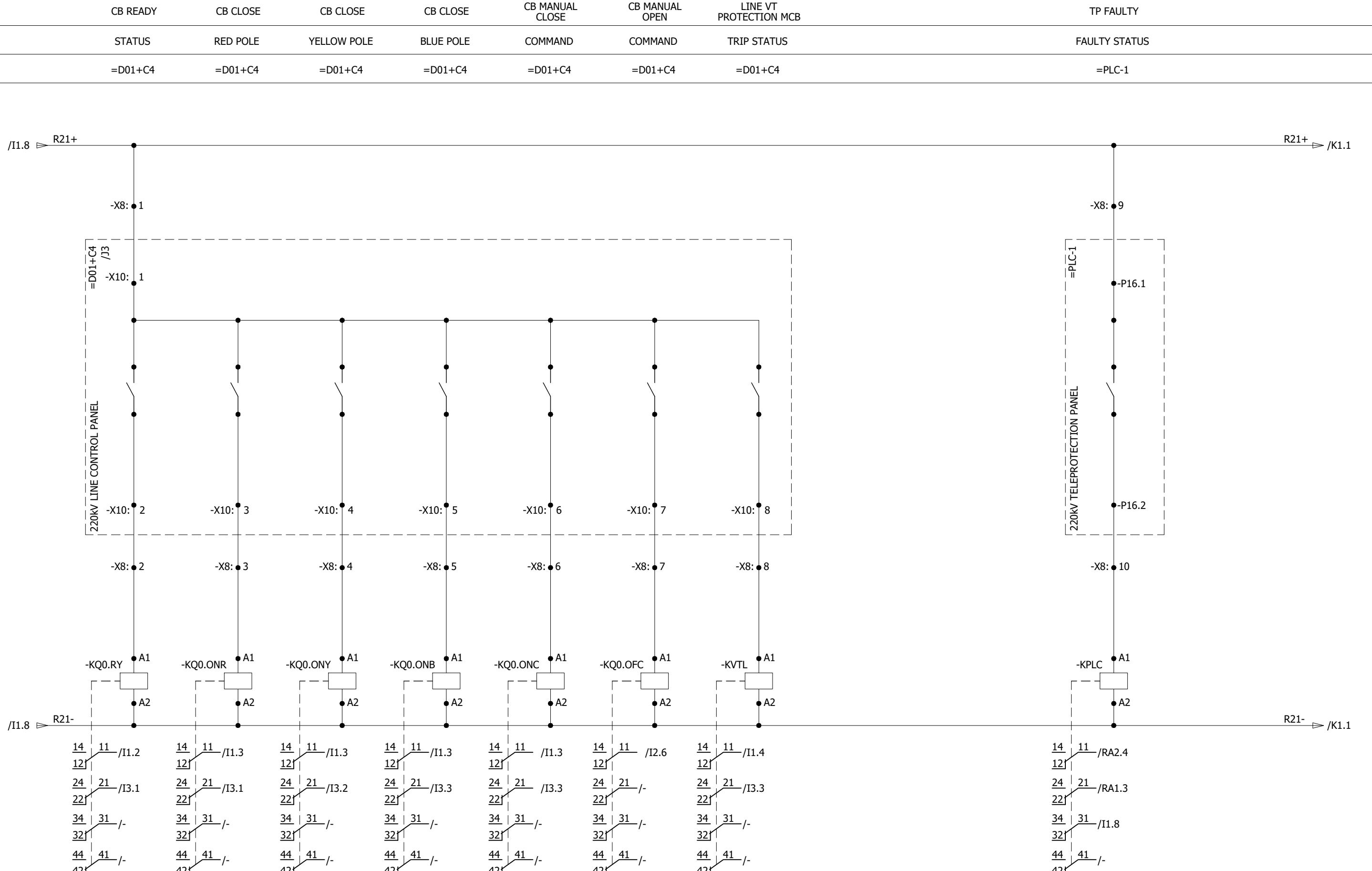


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	CB READY	CB CLOSE	CB CLOSE	CB CLOSE	CB MANUAL CLOSE	LINE CCVT MCB HEALTHY	BUSBAR VT MCB HEALTHY	DISTANCE ZONE-1		
A	STATUS	RED POLE	YELLOW POLE	BLUE POLE	COMMAND	STATUS	STATUS	R-PHASE	Y-PHASE	B-PHASE
					=D01+C4	TRIP	TRIP	TRIP		



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	AUTO RECLOSER INPUTS	P-60194-E-RLC-SC-001	Project no.	Sheet type	Sheet no.
										P-60194	I3	15	



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## DISTANCE PROTECTION GENERAL TRIPS

RED-PH    YELLOW-PH    BLUE-PH

## DIRECT TRANSFER TRIP

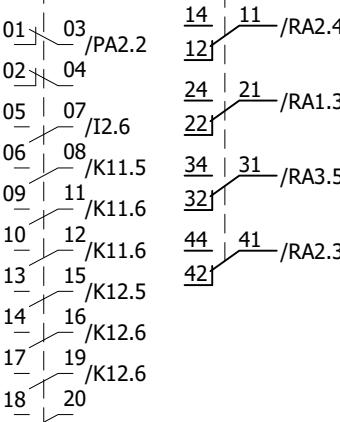
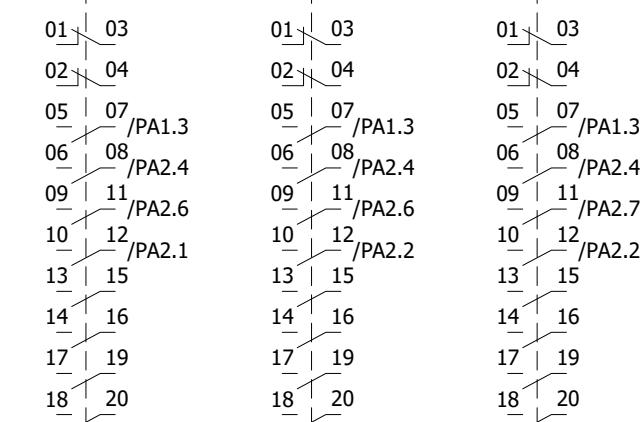
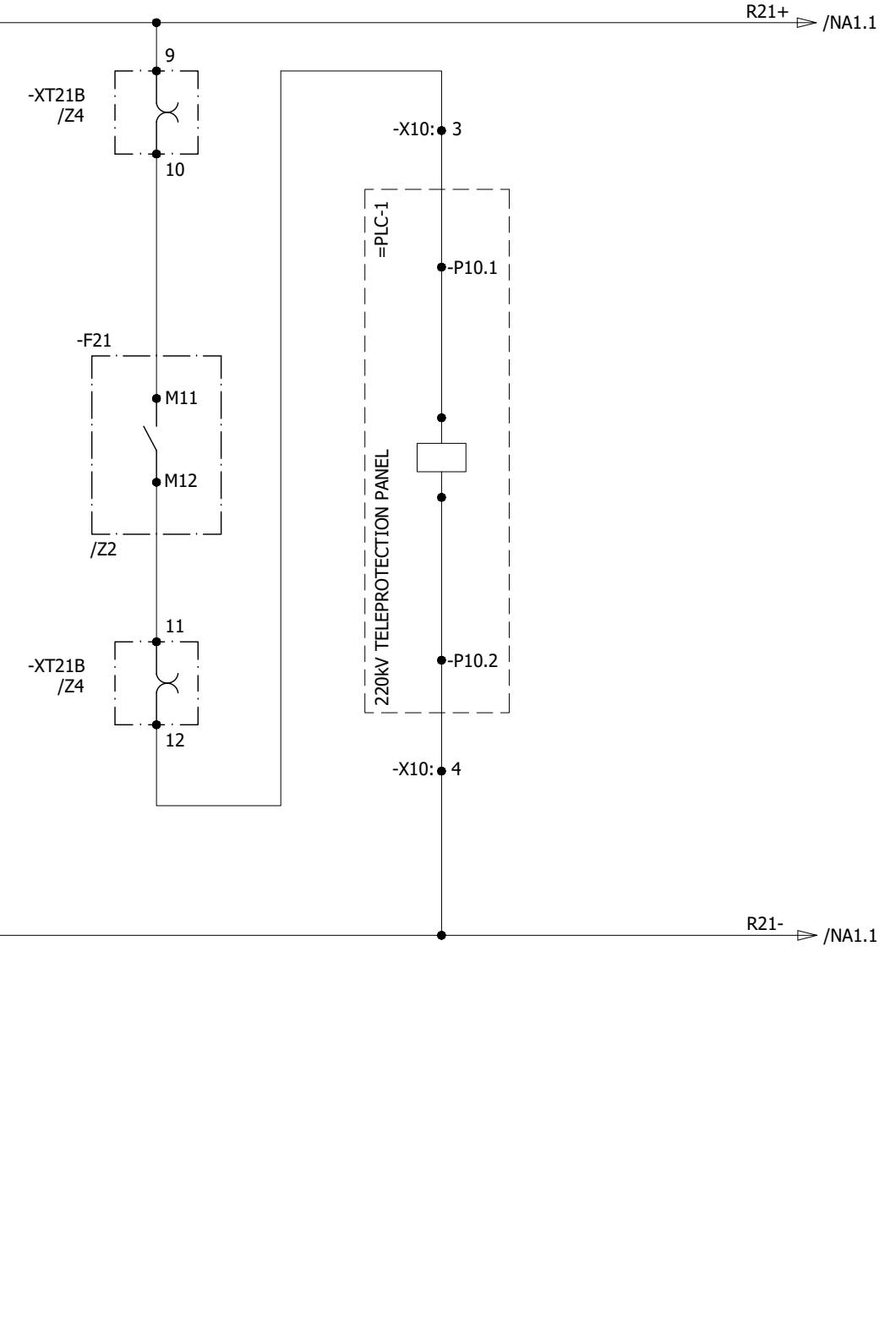
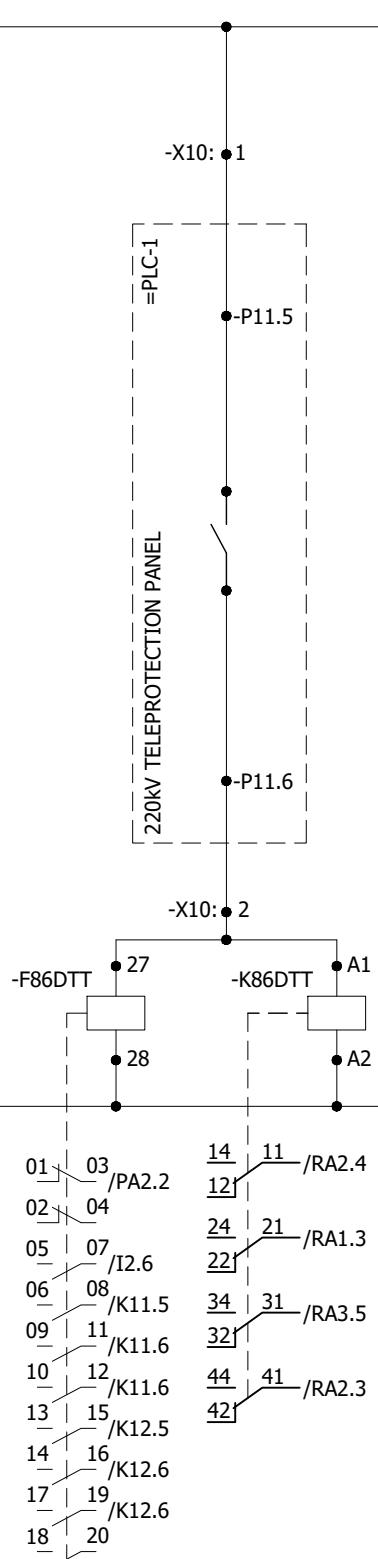
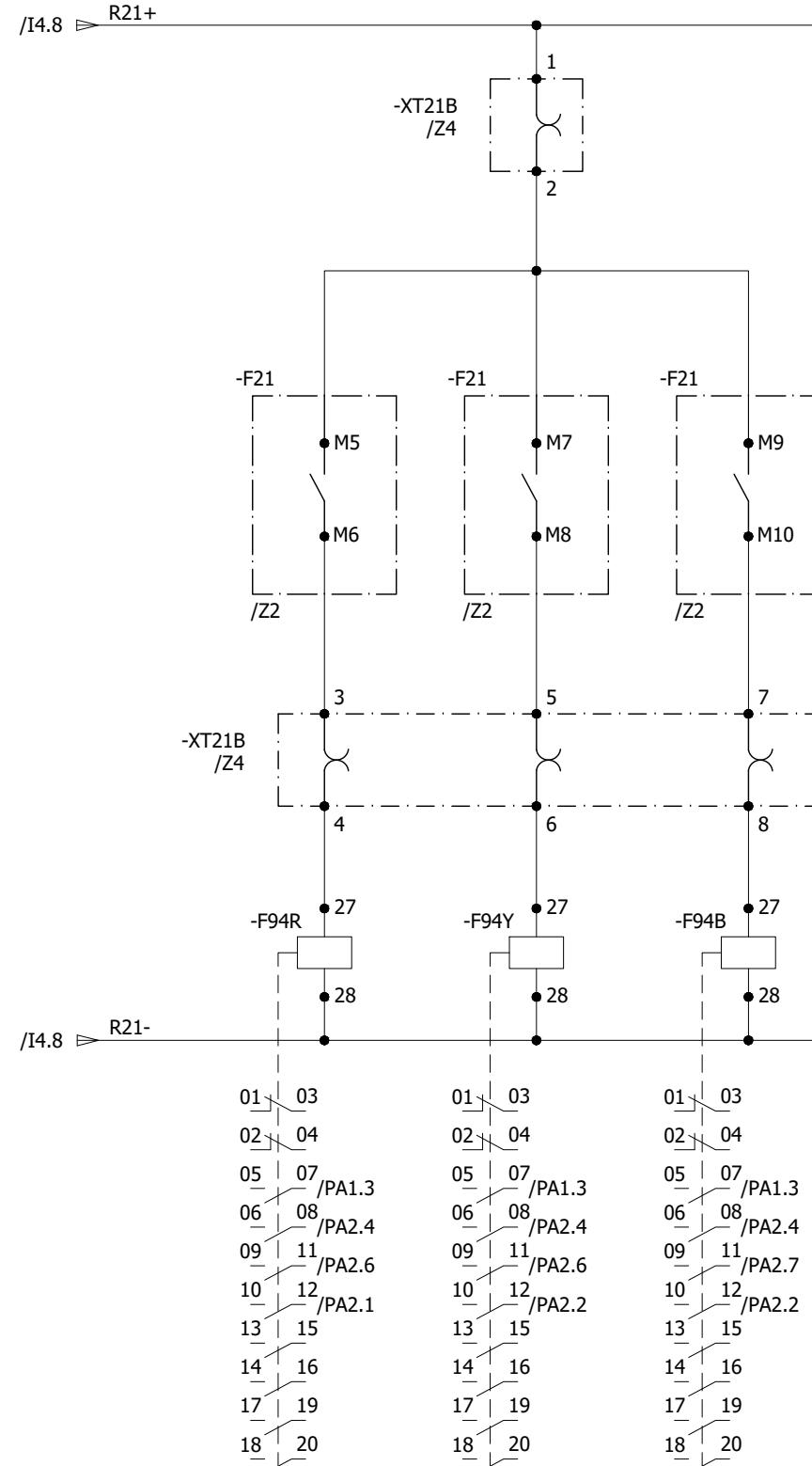
RECEIVED

## PERMISSIVE TRANSFER TRIP

=PLC-1

SENT

=PLC-1



A  
B  
C  
D  
E  
F

A  
B  
C  
D  
E  
F

0	AS BUILT	20.11.2018	ASJ	Manufacturer  21-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV LINE RELAY SET-1 PANEL (=D08+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

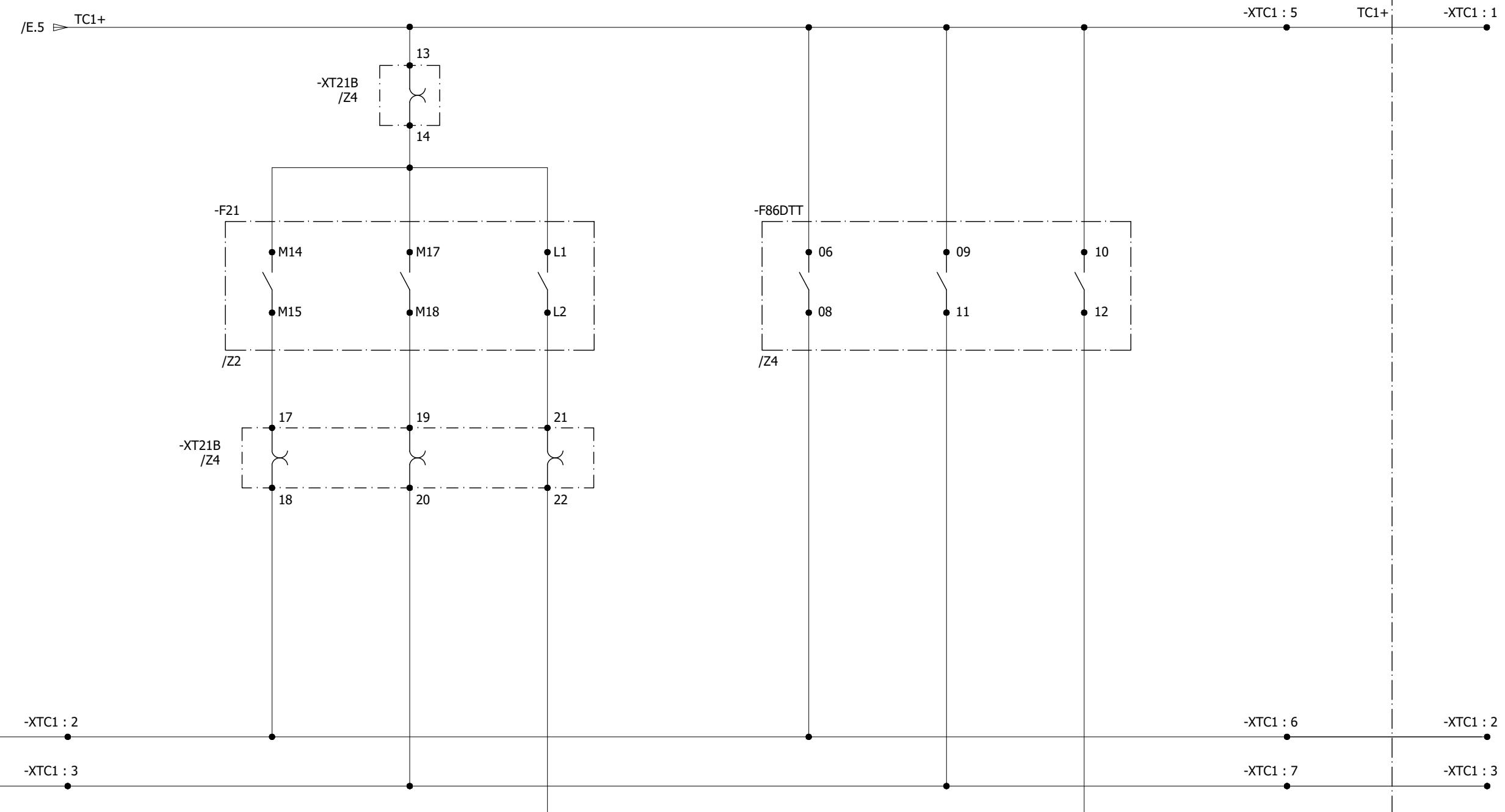
RED-PH      YELLOW-PH      BLUE-PH

RED-PH      YELLOW-PH      BLUE-PH

=D01+R2

/L52

/K11



0	AS BUILT		20.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.			
					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 (=D08+R1) TRIP CIRCUIT FOR COIL - 1	P-60194-E-RLC-SC-001	Project no.	Sheet type	Sheet no.
REV.	DESCRIPTION		DATE	DRAWER						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

-XT21B /Z4

15

16

-F21

/Z2

L3      L5      L7  
L4      L6      L8

-F86DTT

/Z4

13      14      17  
15      16      19

-XTC2 : 6      -XTC2 : 2

-XT21B /Z4

23      25      27  
24      26      28

-XTC2 : 7      -XTC2 : 3

-XTC2 : 8      -XTC2 : 4

-XTC2 : 6      -X

-XTC2 : 7      -X

-XTC2 : 8      -X

A

A

B

B

C

C

D

D

E

E

F

F

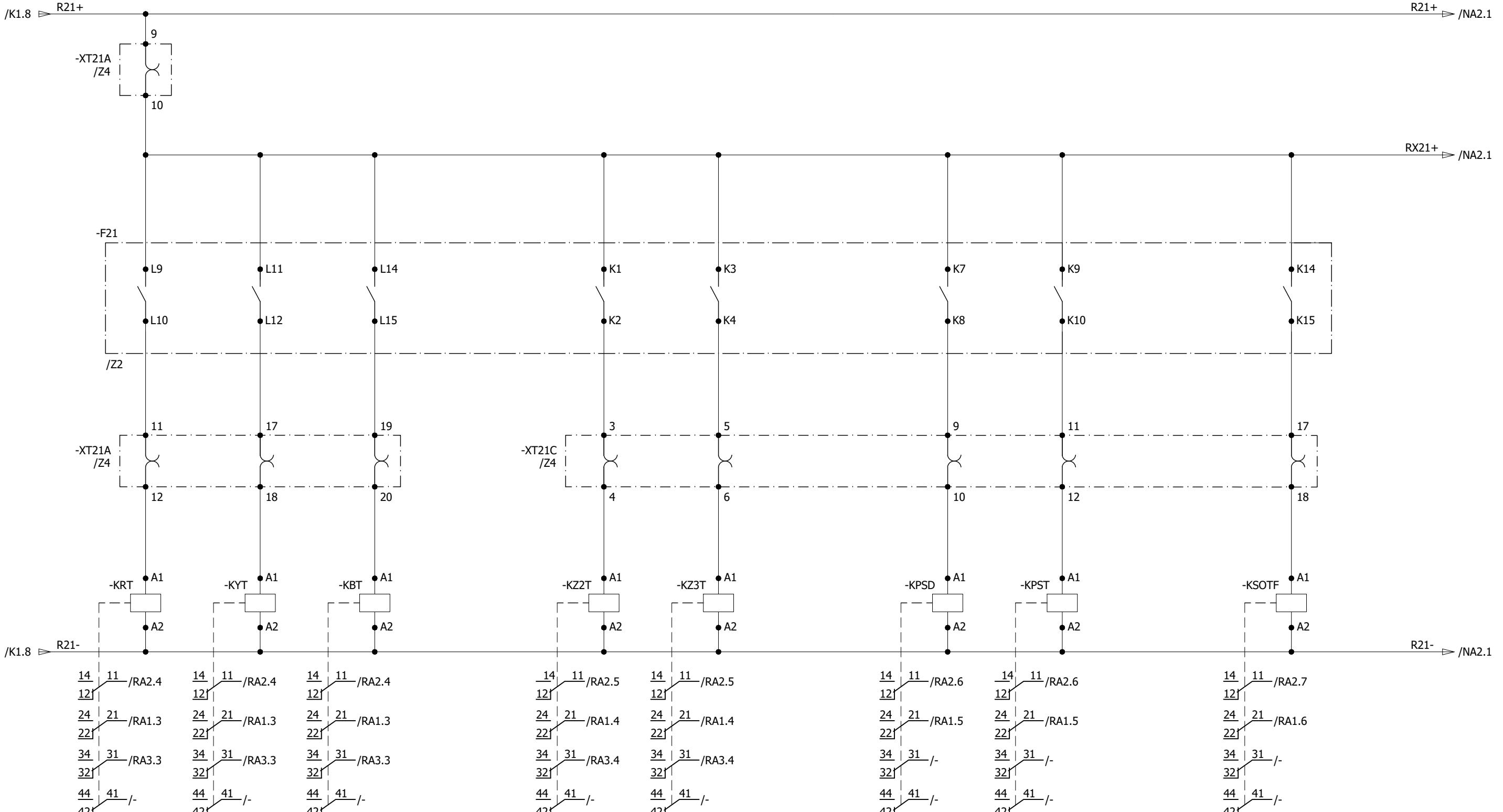
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K12
									Sheet no. 19

## DISTANCE PROTECTION SET-1 ALARMS

RED-PH  
TRIPYELLOW-PH  
TRIPBLUE-PH  
TRIP

ZONE-2 TRIP

ZONE-3 TRIP

POWER SWING  
DETECTPOWER SWING  
TRIPSWITCH ON TO  
FAULT TRIP

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A

A

B

B

C

C

D

D

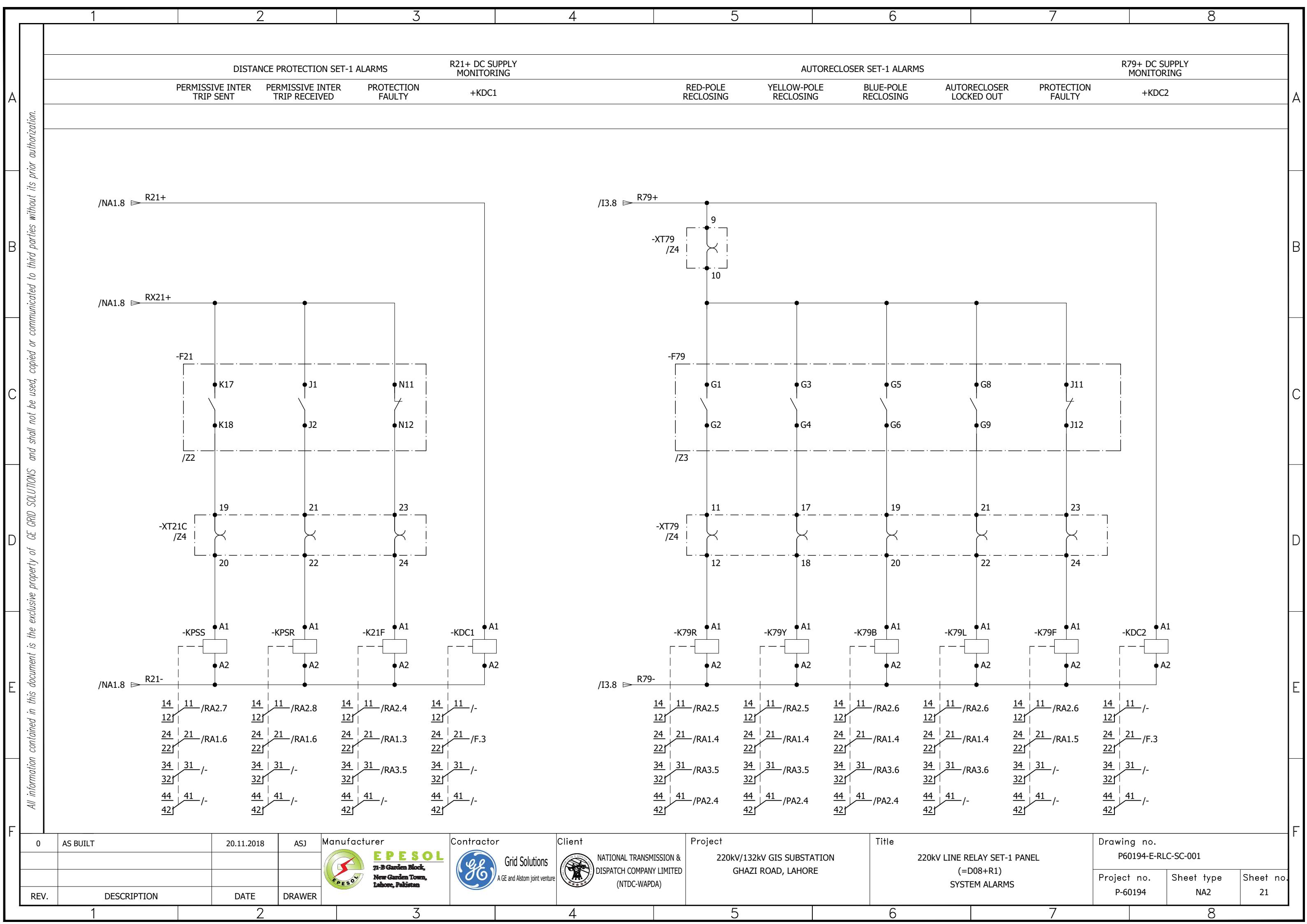
E

E

F

F

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 (=D08+R1) SYSTEM ALARMS	Drawing no. P60194-E-RLC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194      Sheet type NA1      Sheet no. 20



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A

B

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E

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A

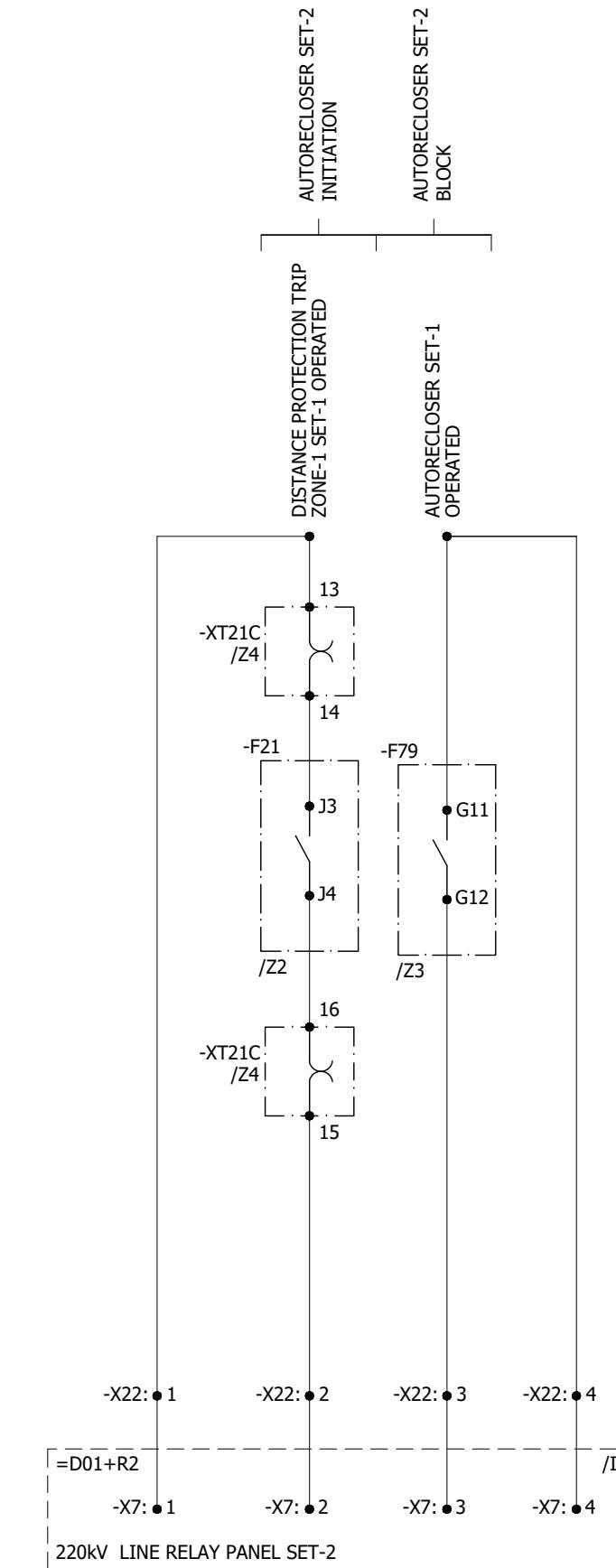
B

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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 (=D08+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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A

A

B

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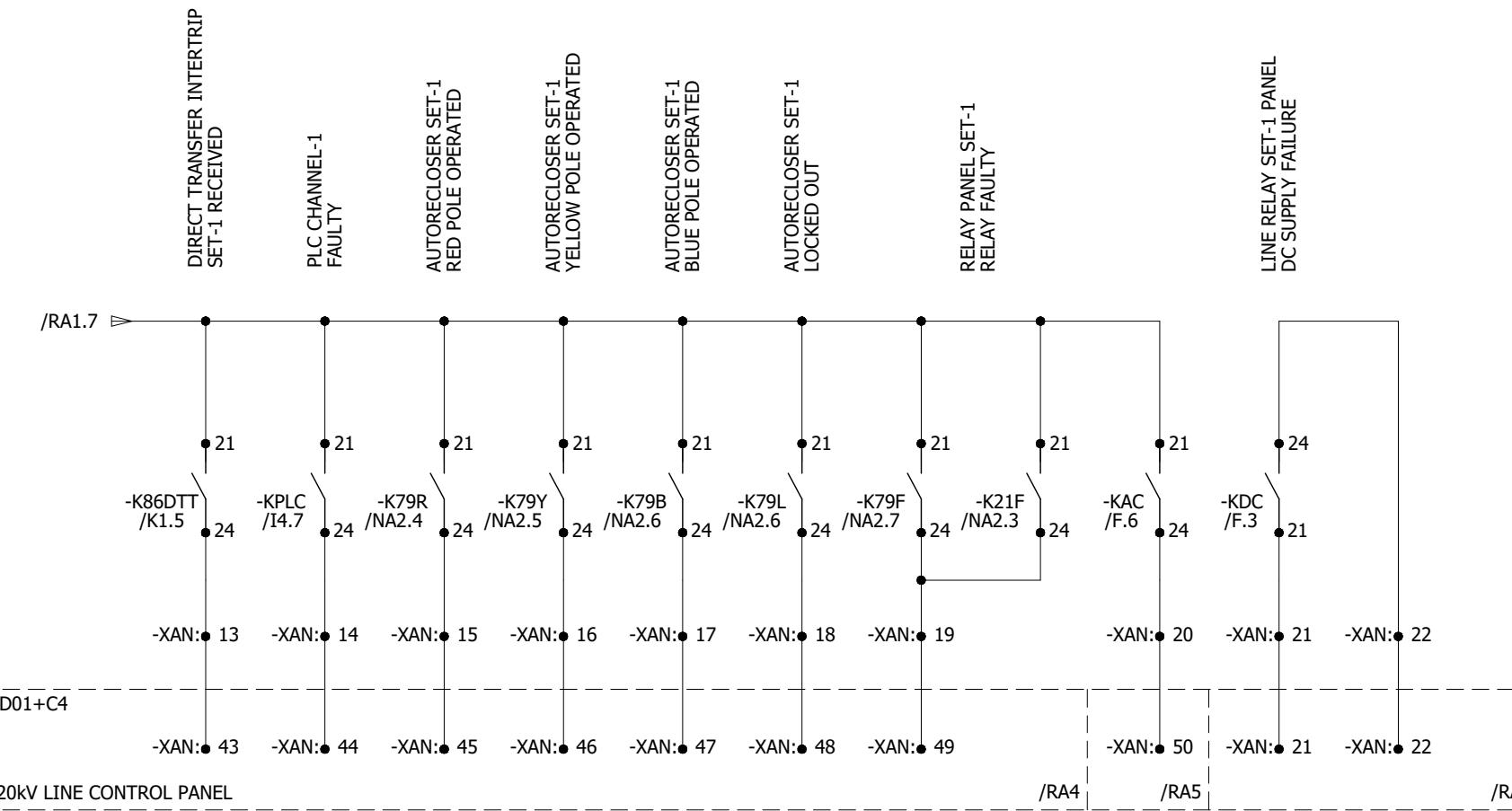
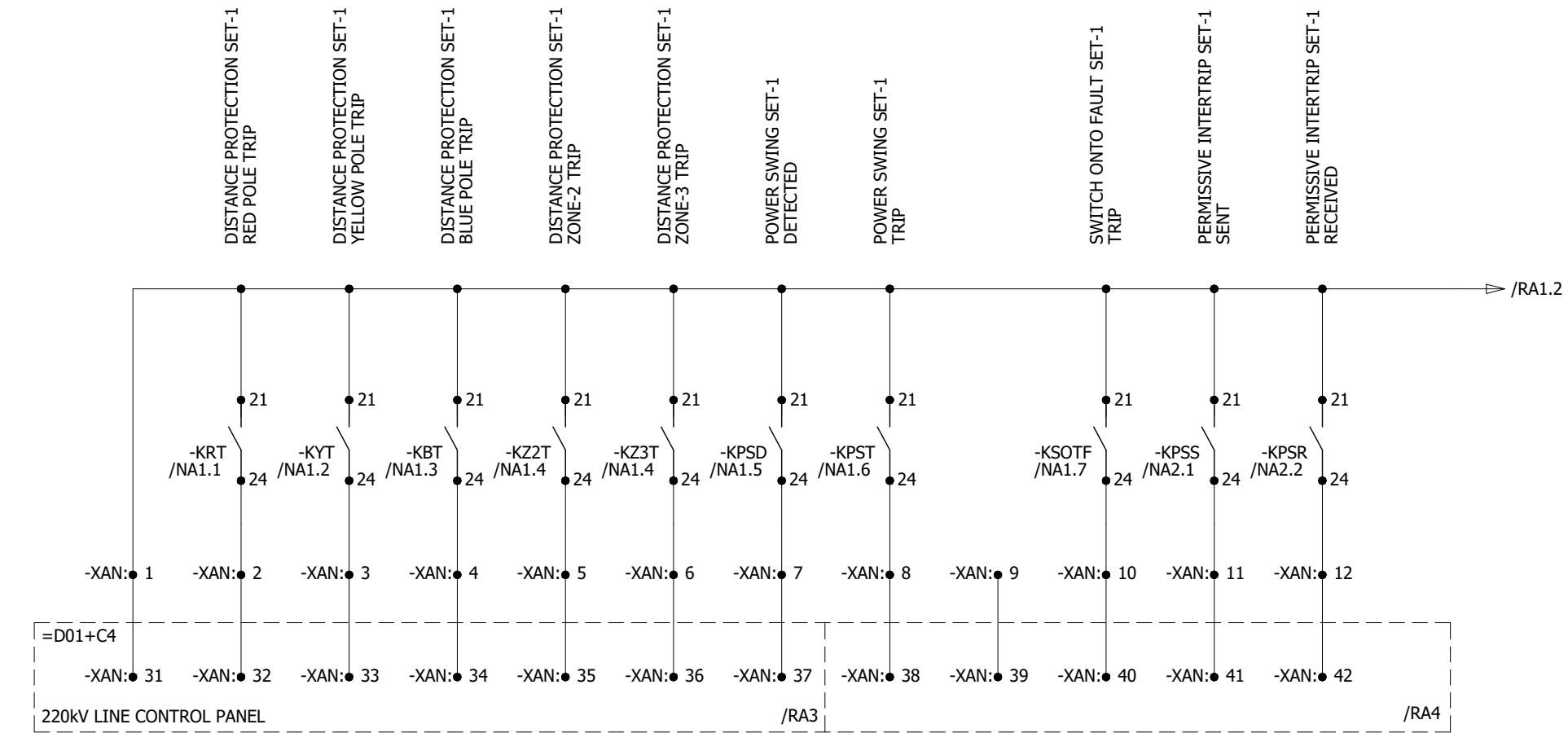
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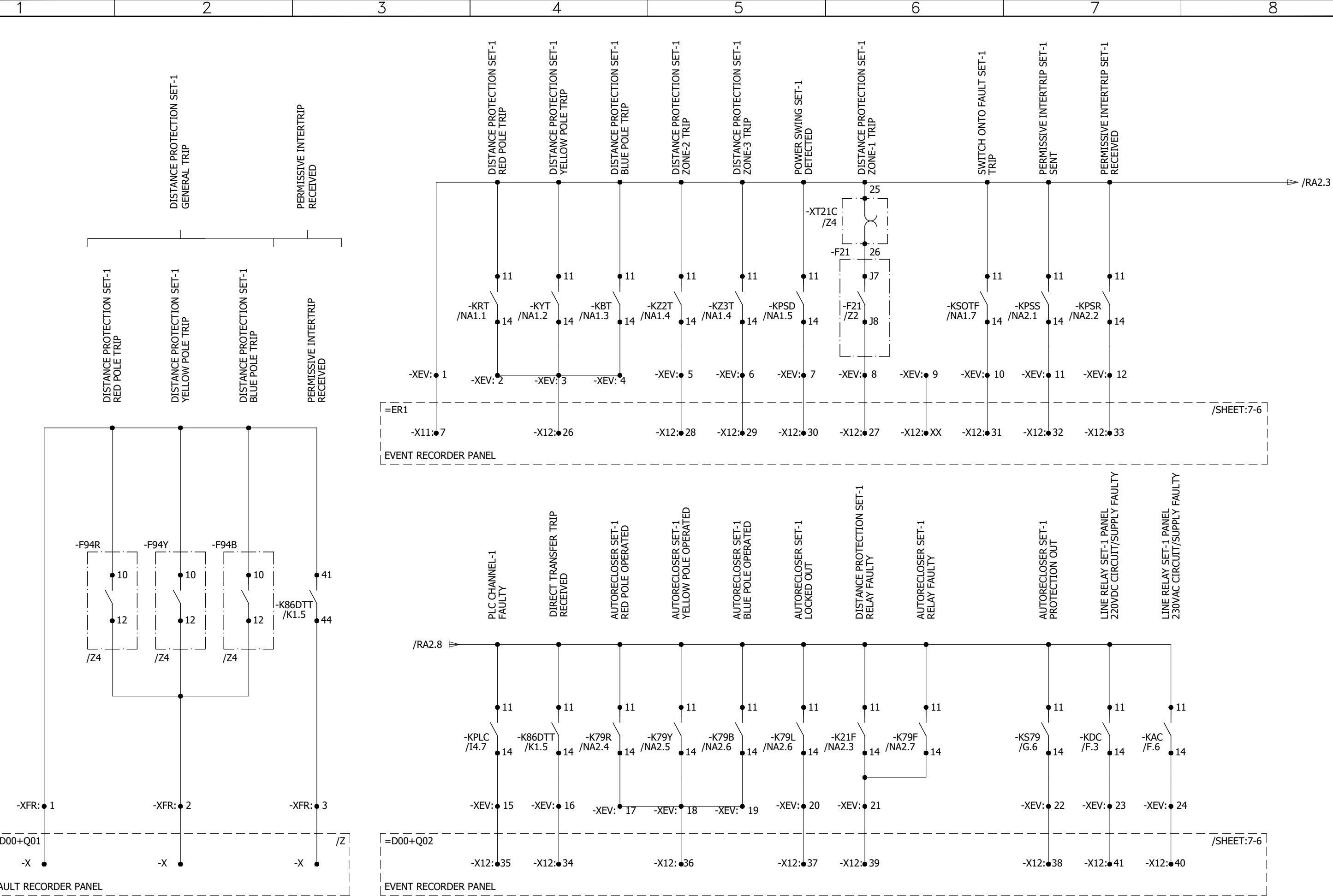
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F

F



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 (=D08+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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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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1

1

1

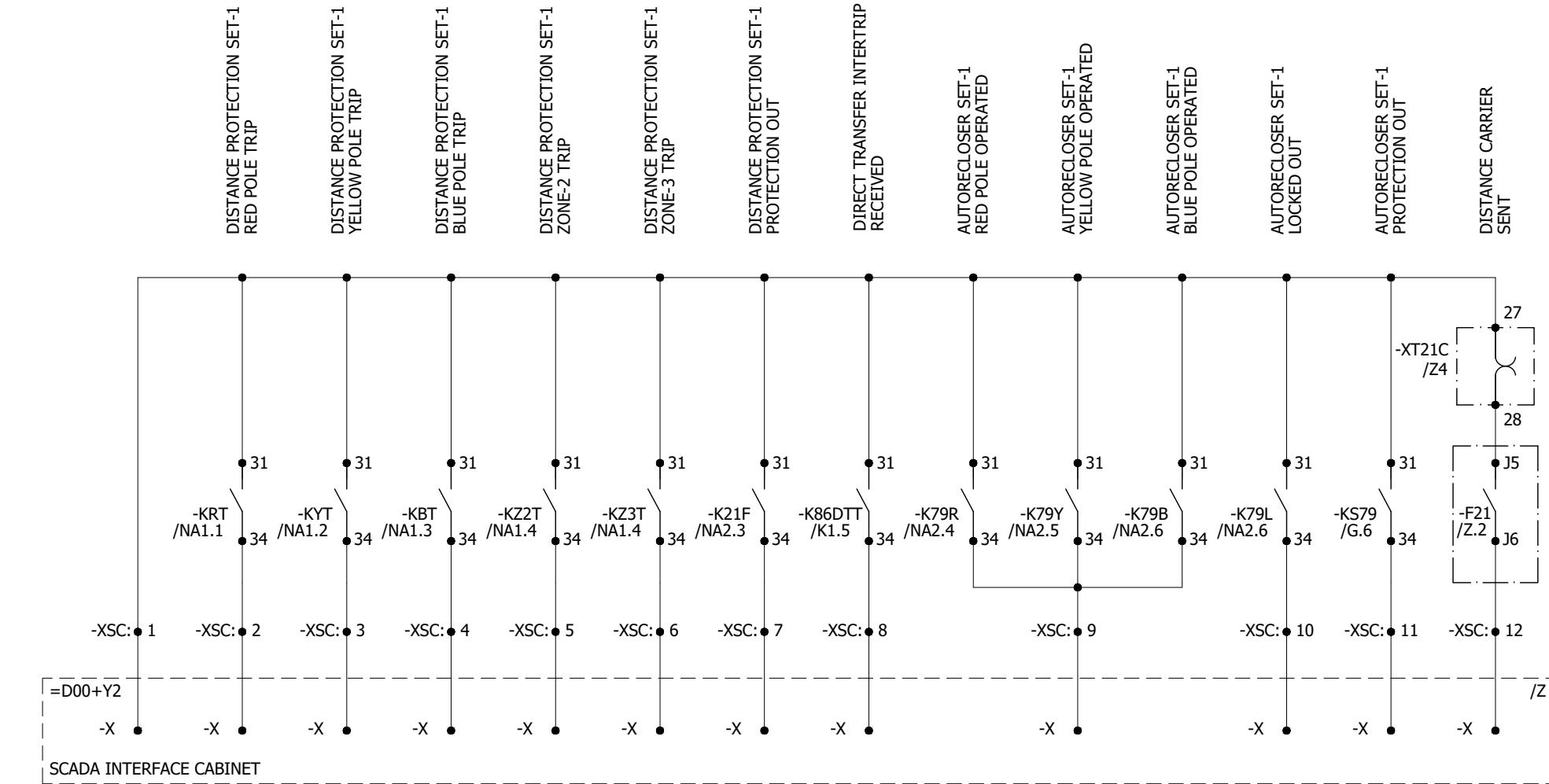
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8

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3

4

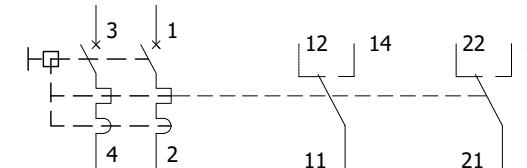
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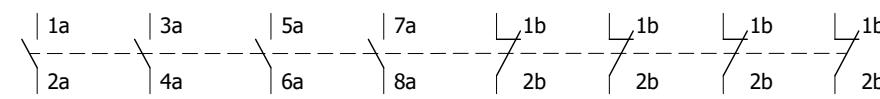
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8

A

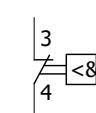
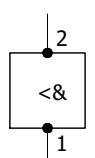
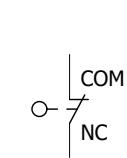


-F101	D.2	F.6	
-F102	D.4	F.6	
-F103	D.6	F.6	
-F201	E.2	F.2	
-F202	E.3	F.2	
-F203	E.4	F.2	
-F204	E.5	F.3	



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

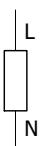
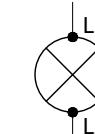
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-S100	D.3
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-B100	D.4	D.5
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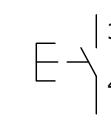
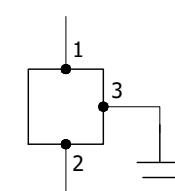
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-H200	F.4

-R100	D.5
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D



-X100	D.7
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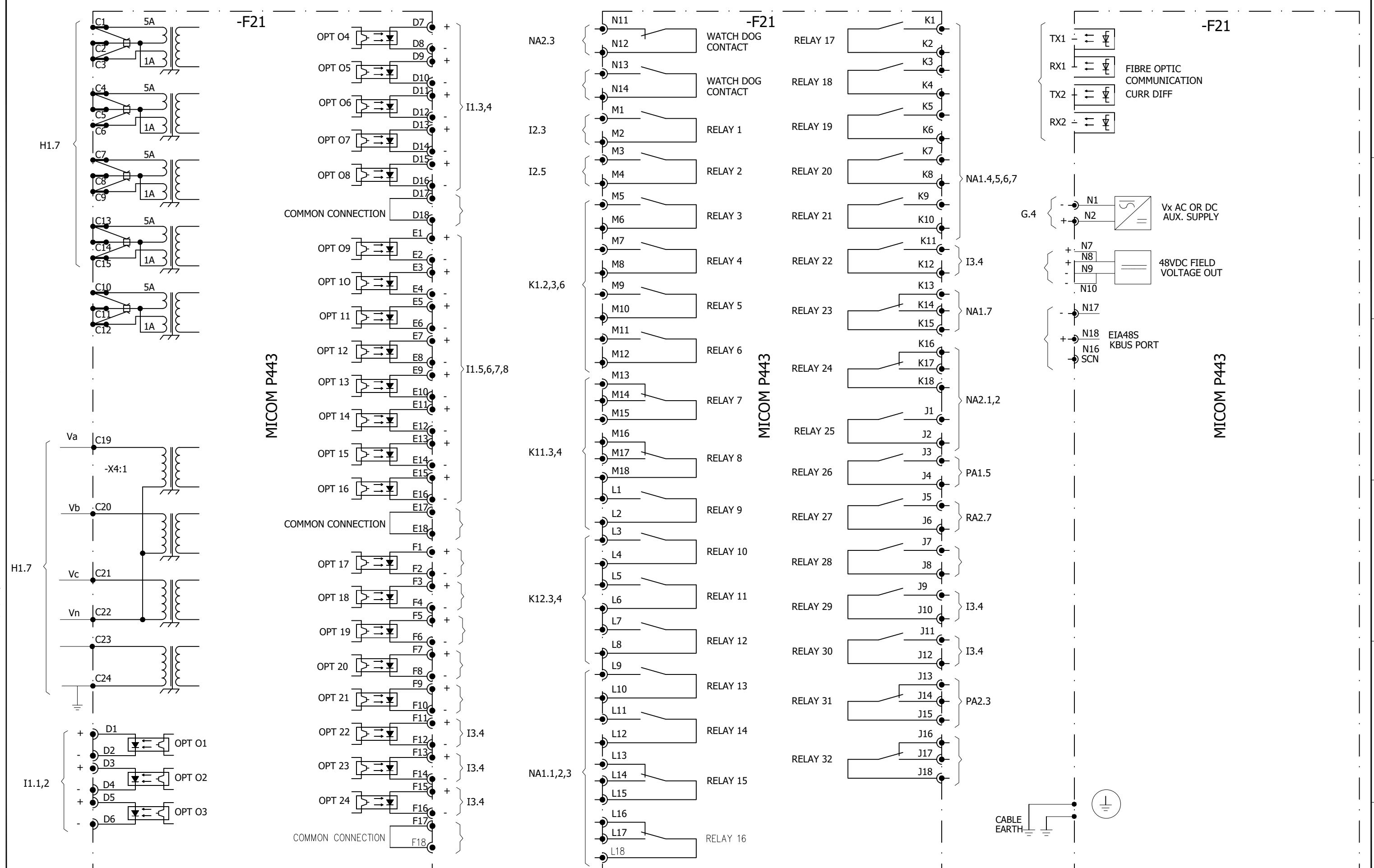
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E

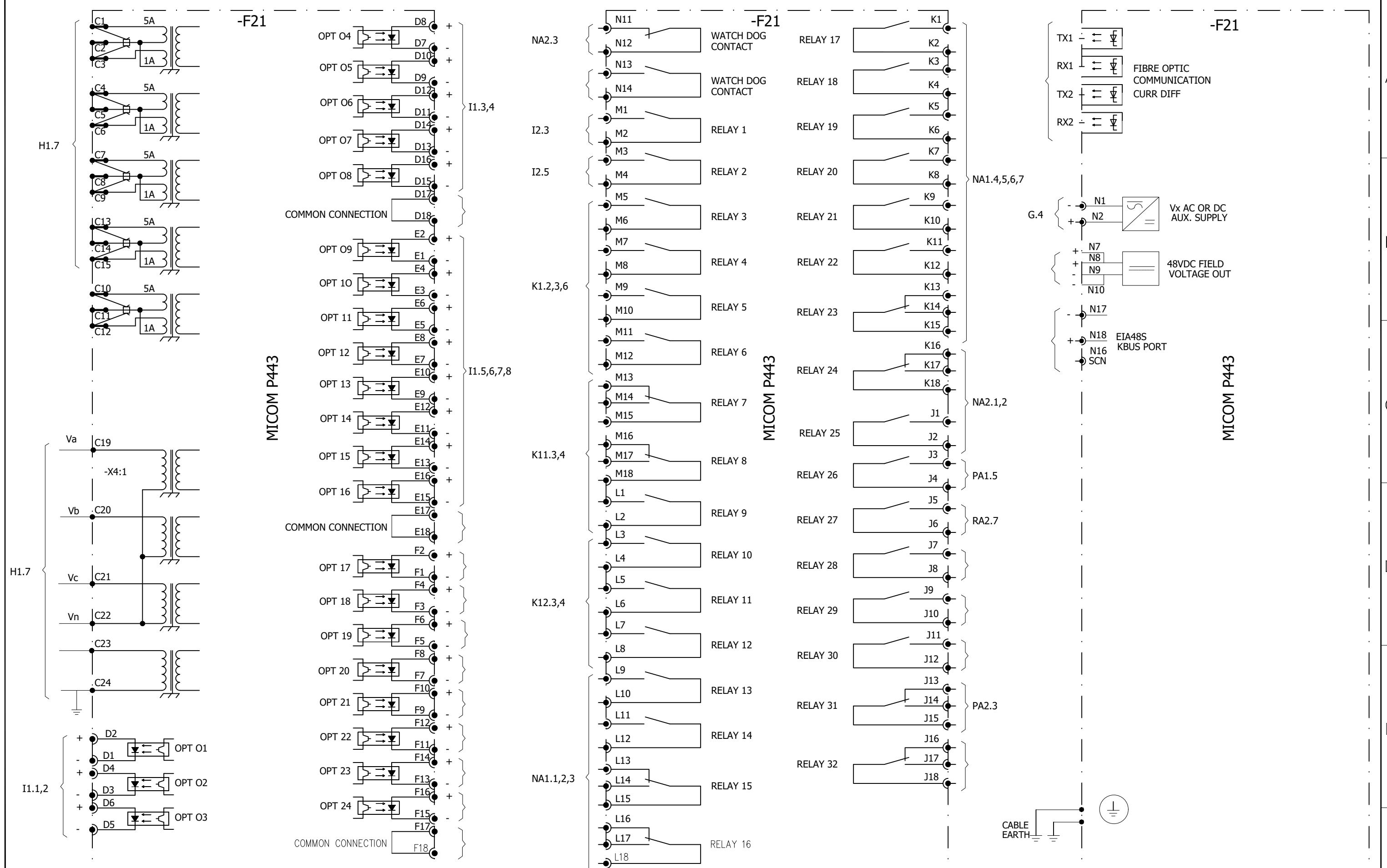
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0	AS BUILT	20.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV LINE RELAY SET-1 PANEL (=D08+R1) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z1	Sheet no. 27
1		2	3								

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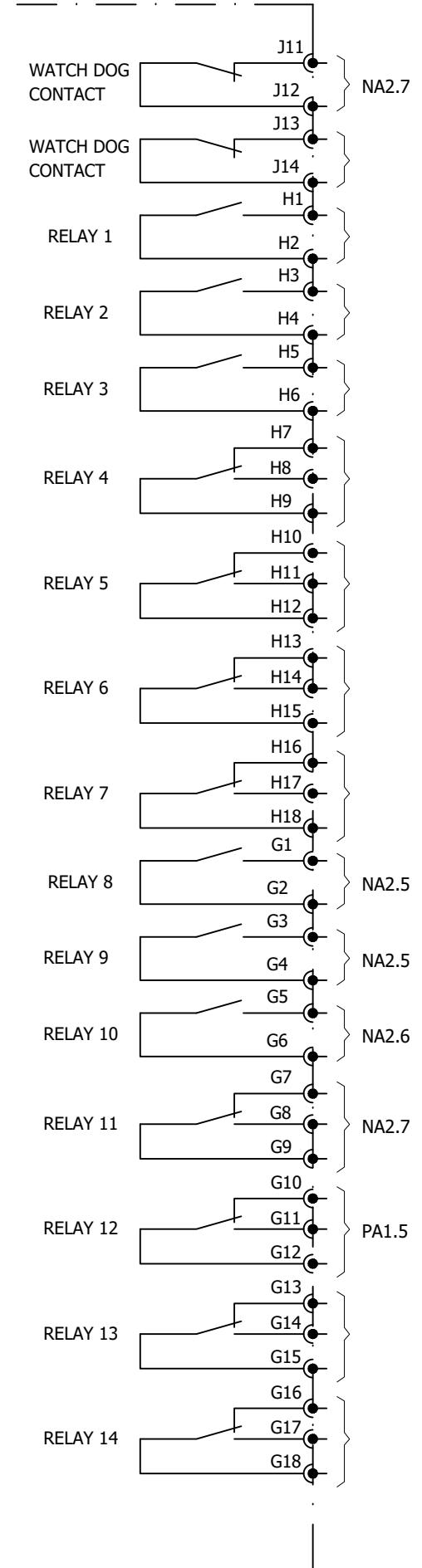
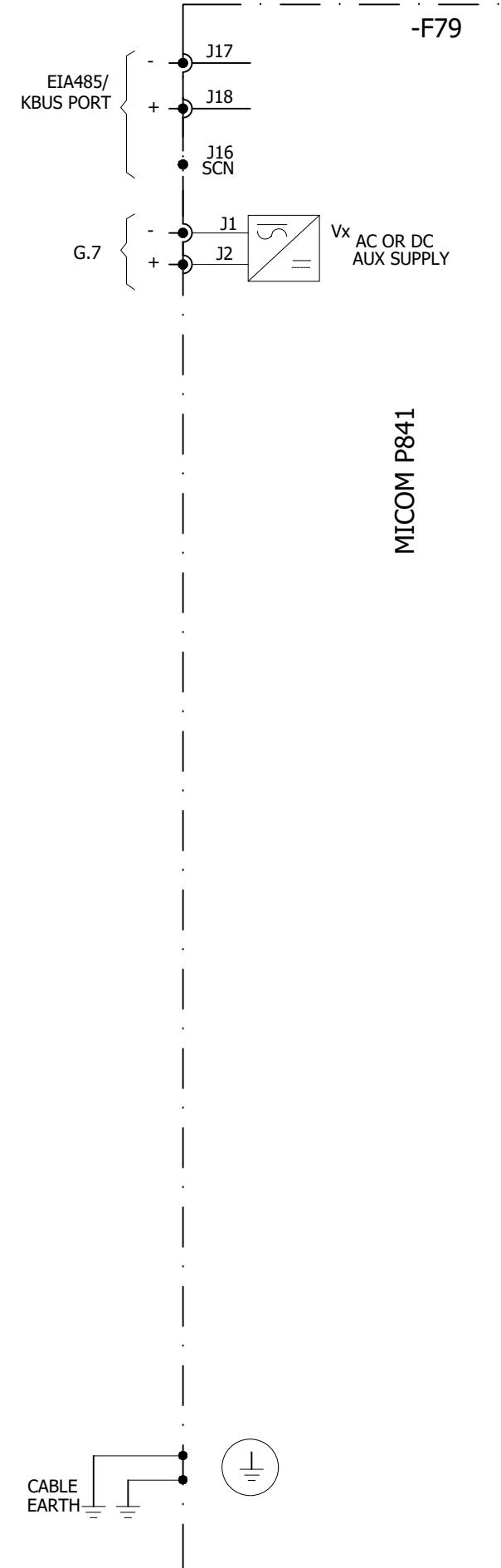
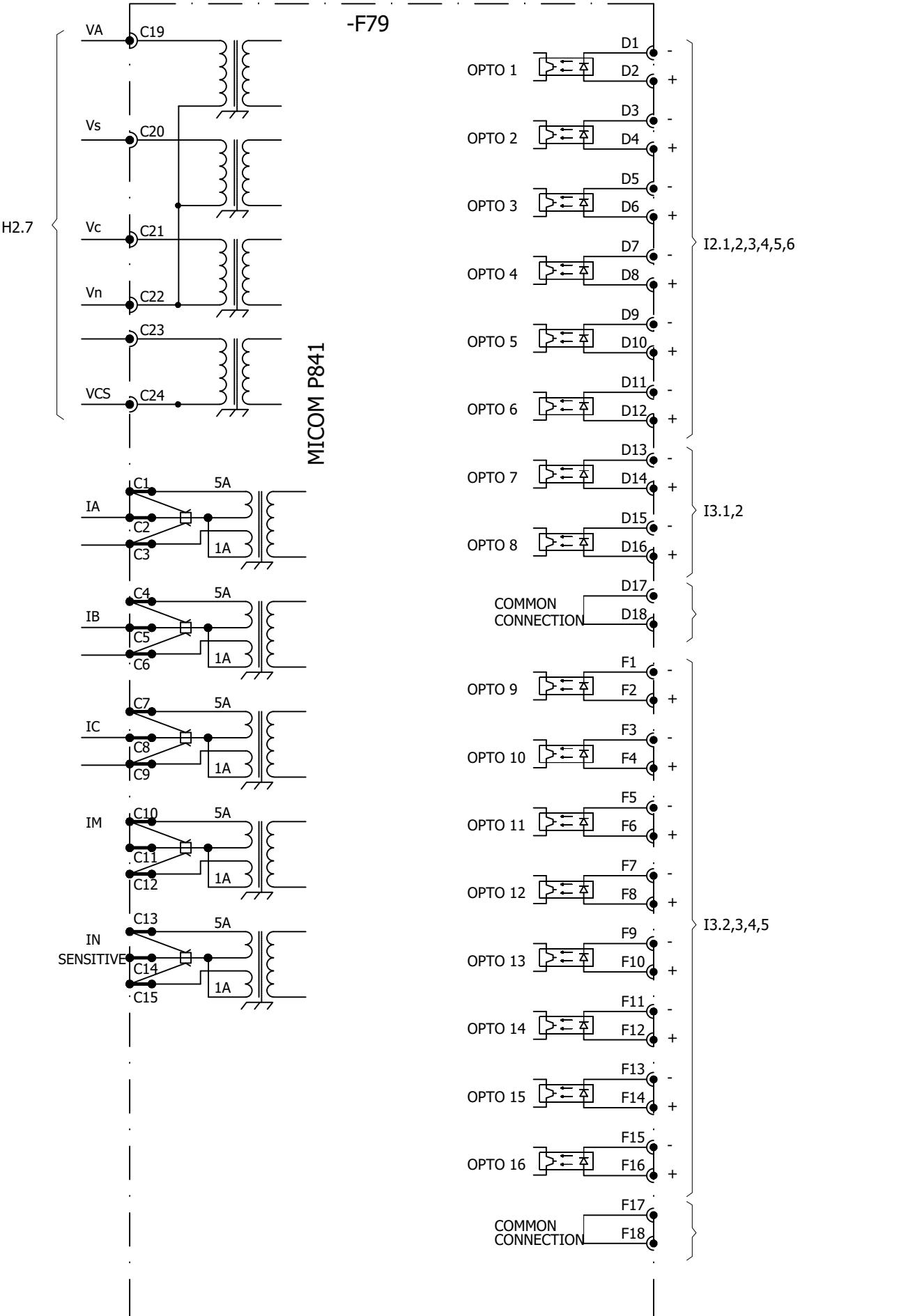


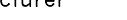
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REV.	DESCRIPTION	DATE	DRAWER	EPEPSOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-1 PANEL (=D08+R1) COMPONENT DIAGRAM	P60194-E-RLC-SC-001
									Project no. P-60194 Sheet type Z2 Sheet no. 28



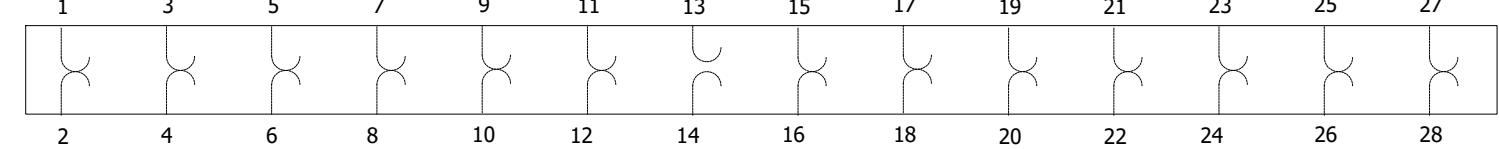
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REV.	DESCRIPTION	DATE	DRAWER	EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV LINE RELAY SET-1 PANEL (=D08+R1) COMPONENT DIAGRAM	P60194-E-RLC-SC-001
									Project no. P-60194 Sheet type Z2 Sheet no. 28

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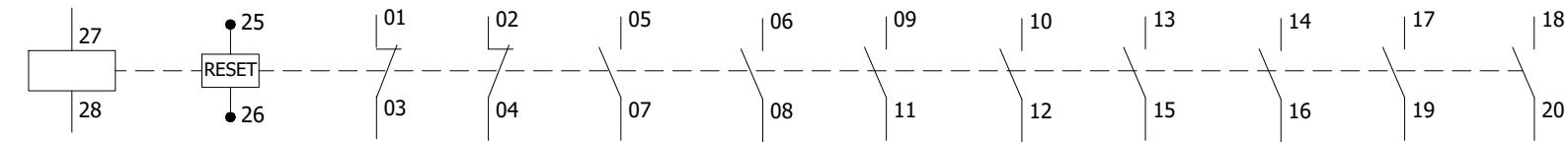


0	AS BUILT	20.11.2018	ASJ	Manufacturer  <b>EPESOL</b> 7-8 Garden Block, New Garden Town, Lahore, Pakistan	Contractor  <b>Grid Solutions</b> A GE and Alstom joint venture	Client  <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV LINE RELAY SET-1 PANEL (=D08+R1) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-001	
									Project no. P-60194	
REV.	DESCRIPTION	DATE	DRAWER						Sheet type Z3	Sheet no. 29

1 2 3 4 5 6 7 8



-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	

A A  
B B  
C C  
D D  
E E  
F F

-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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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 (=D08+R1) COMPONENT DIAGRAM	Drawing no. P60194-E-RLC-SC-001	Project no. P-60194	Sheet type Z4	Sheet no. 30
REV.	DESCRIPTION	DATE	DRAWER									
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