

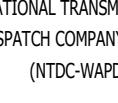


Grid Solutions
A GE and Alstom joint venture

220kV/132kV GIS SUBSTATION GHAZI ROAD , LAHORE

220kV TRANSFORMER RELAY SET-1 PANEL (=D09+R3) 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	22.11.2018	ASJ	MFT	NAH	AS BUILT			
Scale			Sheet size		A3			
NOT-TO-SCALE								
Client								
			NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)					
Contractor			Manufacturer					
			 EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan					
Project								
220kV / 132kV GIS SUBSTATION GHAZI ROAD , LAHORE								
Title								
220kV TRANSFORMER RELAY SET-1 PANEL (=D09+R3) SCHEMATIC DRAWINGS								
Order no			Document no					
P-60194			P60194-E-DTR-SC-003					
Sheet type		Total sheets		Sheet no				
A		48		01				

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	PAGE NO.	SHEET NAME	SHEET DESCRIPTION			ISSUE / REVISION										
						A	B	C	D	E	F	01	02	03	04	05
A	01	A	Cover Sheet			X	X									
	02	AA	List Of Contents			X	X									
	03	AB	Symbols and Legends			X	X									
	04	AC	Component List			X	X									
	04A	AC	Component List			X	X									
	05	AD	Panel View			X	X									
	06	AE	Bay Concept & Protection Logics			X	X									
B	07	D	AC Supply Distribution Circuit			X	X									
	08	E	DC Supply Distribution Circuit			X	X									
	09	F	AC/DC Supply Failure Circuits			X	X									
	10,11	G1,G2	Relay Control & Supply Circuits			X	X									
	12	H1	Differential Relay Protection CT Circuit			X	X									
	13	H2	REF Protection CT Input Circuit			X	X									
	14	H3	Thermal Overload Relay CT Input Circuit			X	X									
C	15	H4	Over Excitation Relay VT Inputs			X	X									
	16	H5	HV OCP/EFP Relay CT Inputs			X	X									
	17	H6	LV OCP/EFP Relay CT Inputs			X	X									
	18,19,20	K1, K2, K3	Protection Trips Circuit			X	X									
	21,22,23	K11, K12, K13	Trip Circuit for Coil-1			X	X									
	24,25,26	K21, K22, K23	Trip Circuit for Coil-2			X	X									
	27,28	K31, K32	Trip Circuit for 132kV Breaker Coil-1			X	X									
D	29,30	K41, K42	Trip Circuit for 132kV Breaker Coil-2			X	X									
	31,32	NA1, NA2	System Alarm Circuits			X	X									
	33,34	O1, O2	Reset Circuit For Tripping Relays			X	X									
	35,36,37,38	PA1, PA2, PA3, PA4, PA5	Protection Inter-Circuits			X	X									
	39	RA1	CP Annunciation Circuit			X	X									
	40	RA2	Event Recorder Circuit			X	X									
	41	RA3	SCADA Circuit			X	X									
E	42	RA4	Fault Recorder Circuit			X	X									
	43,44,45,46,47	Z1, Z2, Z3, Z4, Z5	Component Diagram			X	X									
F	0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) LIST OF CONTENTS	Drawing no. P60194-E-DTR-SC-003						
REV.	DESCRIPTION	DATE	DRAWER													
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	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			24	OVER EXCITATION
L				OPTO CONTACTS			79	AUTO-RECLOSING
M				RELAY CONTACTS			49	THERMAL OVERLOAD
N				HOOTER			87T	TRAFO DIFFERENTIAL
O				AC BELL			87C	DIFFERENTIAL CONNECTION
P							87BB	DIFFERENTIAL BUSBAR

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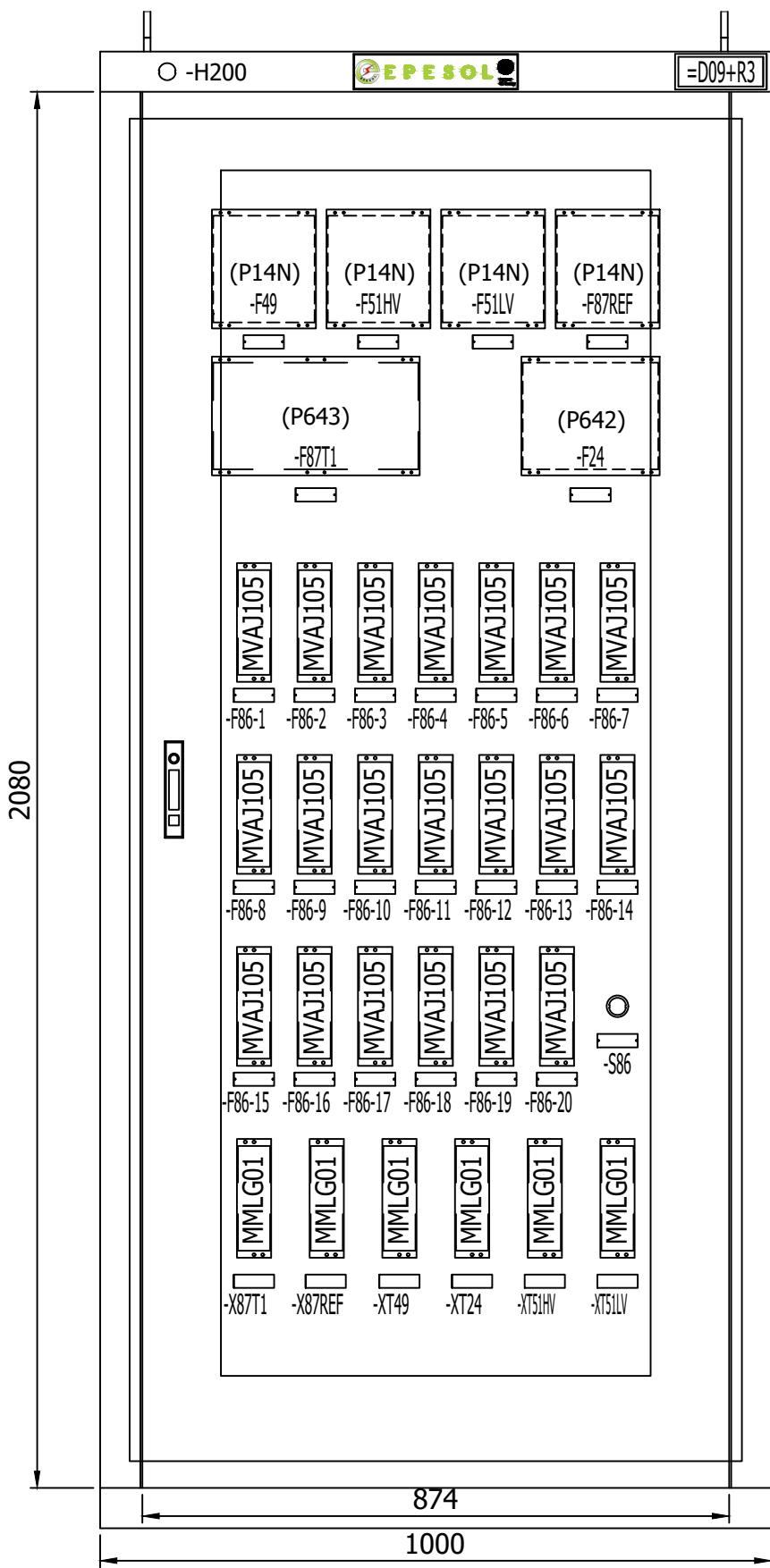
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type AB Sheet no. 03
1	2	3	4	5	6	7	8		

	1	2	3	4	5	6	7	8			
A	QTY.	DEVICE DESCRIPTION		DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION		MANUFACTURER		
	01	TRANSFORMER DIFFERENTIAL PROTECTION RELAY		AGILE P643, Cortec: P64391BA6M0060M Supply: 110-250VDC / 100-240VAC, 12 CT + 1 VT (Vn=100-120V),(In=1/5A) Inputs 16 Opto Inputs, 16 Relay Outputs			-F87T1		GE GRID SOLUTIONS		
B	01	OVER EXCITATION PROTECTION RELAY		AGILE P642, Cortec: P64291BA6M0060P Supply: 110-250VDC / 100-240VAC, 1 VT + 8 CT (Vn=100-120V),(In=1/5A) Inputs 8 Opto Inputs, 8 Relay Outputs			-F24		GE GRID SOLUTIONS		
	04	OVERCURRENT EARTHFAULT RELAY		AGILE P14N, Cortec: P14N-B16A7C0570A Supply: 24-250VDC / 110-240VAC, 4 CT (In=1/5A) Inputs 8 Opto Inputs, 8 Relay Outputs			-F49, -F51HV, -F51LV, F87REF		GE GRID SOLUTIONS		
C	06	TEST BLOCK		MMLG01, Cortec: MMLG01-R1AA9002D			-XT87T1, -XT87REF, -XT49, -XT24, -XT51HV, -XT51LV,		GE GRID SOLUTIONS		
	20	TRIPPING RELAY (HAND/ELECTRICAL RESET)		MVAJ105, Cortec: MVAJ105-RA1002A Supply: 220-250VDC, 8 NO + 2 NC Contacts			-F86-1 TO -F86-20		GE GRID SOLUTIONS		
D	02	CONTROL MCB - PANEL LIGHT & HEATER		G62C02+(CAH2),2-Pole, Ratings: 2A, 230VAC, 6kA @ 230VAC, 2 C/O Contacts			-F101-102		GE		
	01	CONTROL ELCB - PANEL SOCKET		DM100C216/030+(CAH2),2-Pole, Ratings: 16A, 30mA, 230VAC, 2 C/O Contacts			-F103		GE		
E	04	CONTROL MCB - DC DISTRIBUTION		EP102UCC04+(CAH2),2-Pole, Ratings: 4A, 220VDC, 10kA, 2 C/O Contacts			-F201 ~ - F204		GE		
	01	PUSHBUTTON - DIRECT TRANSFER TRIP RESET		YS-AP1-2-40-B-D-W, Black button, Spring return, 2-Pole, Ratings: 12A, 220VDC			-S86		YOUNGSUNG		
F	01	AUXILIARY CONTACTOR		MCRC022ATWN-B+MARN211AT, Coil Voltage: 220VDC, 3NO+3NC Contacts			-KCS		GE		
	22	AUXILIARY CONTACTOR		PRC4M40DCML, Coil Voltage: 220VDC, 4 C/O Contacts			-KDCM,-KAC,-KDC1,-KDC2,-K49A,-K24A,K87T,-K87REF,-K49T		GE		
G	02	AUXILIARY CONTACTOR		PRC4M40ANL, Coil Voltage: 230VAC, 4 C/O Contacts			-K24T,-K51HVT,-K51LVT,-KOTHVT,-KOTLVT,-KWTHVT,KWTLVT				
	01	INDICATION LAMP - DC SUPPLY FAILURE		YS-PL-2-AL-22-R-W, Type: Integrated LED , Color : RED , Supply : 230VAC @ 50Hz			-K87F,-K87REF,-K49F,-K24F,-K51HVF,-K51LVF				
H	01	PANEL LIGHT WITH DOOR SWITCH		YST8-30-5W+YSP3315GWB, 230VAC @ 50Hz, 20W, with Door Limit Sw. 1 CO contact			-KACM, -KDC		GE		
	01	THREE PIN SOCKET		1N+PE, 16A, 230VAC @ 50Hz			-H200		YOUNGSUNG		
I	01	PANEL HEATER		230VAC @ 50Hz, 50W			-S100		LEAR		
	01	HUMIDITY & TEMPERATURE CONTROLLER		THERMOSTAT AND HUMIDSTAT			-R100		E-LABS		
J	01	RESISTOR		ZB9016774, (1500 Ohm)			-B100		E-LABS		
	01	METROSIL		600A/S1/S1088			-RS1		-		
K	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-M1		METROSIL		
	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-X4		CABUR		
L	03	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-X5		CABUR		
	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-X6		CABUR		
M	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-X7		CABUR		
	0	AS BUILT		22.11.2018	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 GAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) COMPONENT LIST	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION		DATE	DRAWER					Project no. P-60194	Sheet type AC	Sheet no. 04

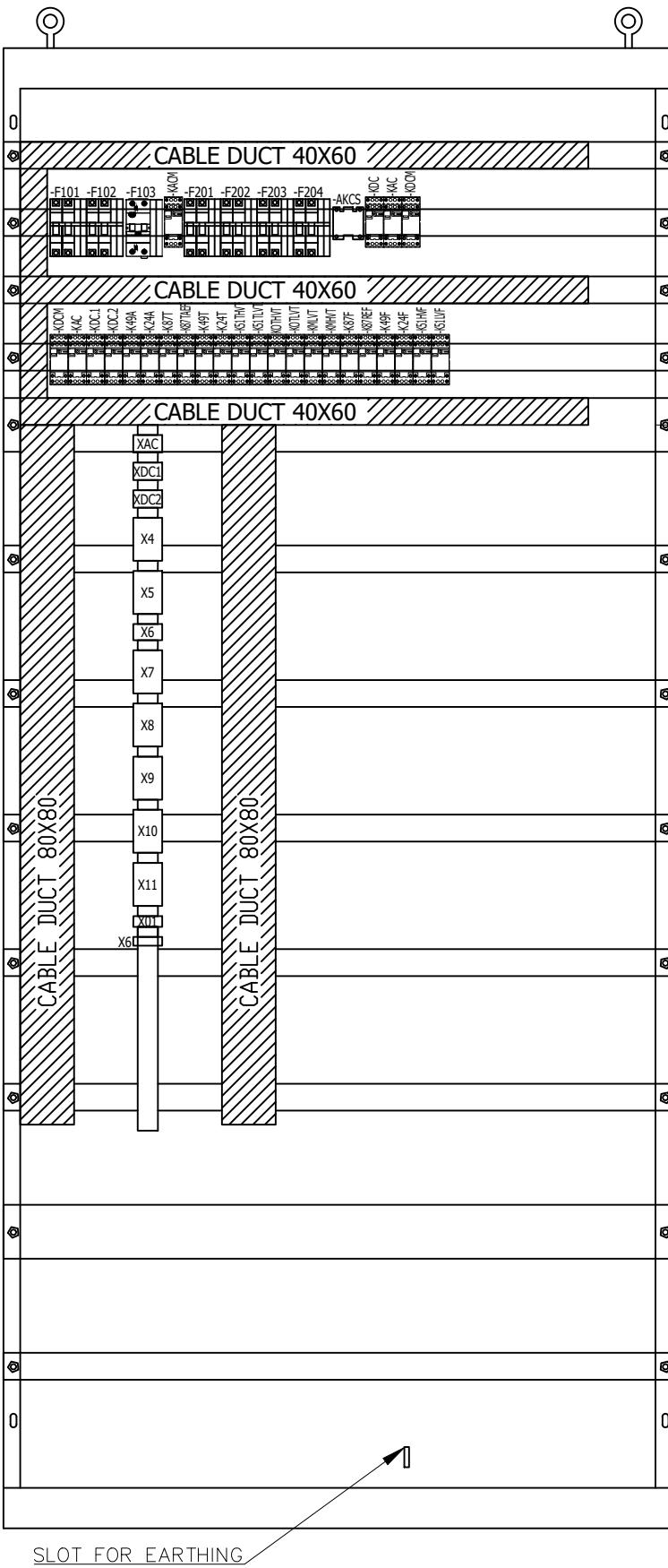
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	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER	
A	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT	Type: SCB-6			-X8	CABUR	
	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT	Type: SCB-6			-X9	CABUR	
	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT	Type: SCB-6			-X10	CABUR	
	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT	Type: SCB-6			-X11	CABUR	
B	02	TERMINAL BLOCKS FOR VT	Type: SCB-6			-X01	CABUR	
	05	TERMINAL BLOCKS FOR AC SUPPLY	Type: CBD-4			-XAC	CABUR	
	04	TERMINAL BLOCKS FOR DC SUPPLY-1	Type: CBD-4			-XDC1	CABUR	
	04	TERMINAL BLOCKS FOR DC SUPPLY-2	Type: CBD-4			-XDC2	CABUR	
C	02	TERMINAL BLOCKS FOR AC FAULTY CIRCUIT	Type: CBD-4			-X12	CABUR	
	06	TERMINAL BLOCKS FOR TRANSFORMER MECH. TRIP	Type: CBD-4			-X02	CABUR	
	13	TERMINAL BLOCKS FOR 220kV CB TRIP CIRCUIT-1	Type: CBD-4			-XTC1	CABUR	
	09	TERMINAL BLOCKS FOR 220kV CB TRIP CIRCUIT-2	Type: CBD-4			-XTC2	CABUR	
D	05	TERMINAL BLOCKS FOR 132kV CB TRIP CIRCUIT-1	Type: CBD-4			-XTC3	CABUR	
	05	TERMINAL BLOCKS FOR 132kV CB TRIP CIRCUIT-2	Type: CBD-4			-XTC4	CABUR	
	11	TERMINAL BLOCKS FOR CLOSE BLOCK, BFI SIGNALS	Type: CBD-4			-X03	CABUR	
	19	TERMINAL BLOCKS FOR ANNUNCIATION SIGNALS	Type: CBD-4			-XAN	CABUR	
E	19	TERMINAL BLOCKS FOR ER SIGNALS	Type: CBD-4			-XEV	CABUR	
	18	TERMINAL BLOCKS FOR SCADA SIGNALS	Type: CBD-4			-XSC	CABUR	
	12	TERMINAL BLOCKS FOR FR SIGNALS	Type: CBD-4			-XFR	CABUR	
F								
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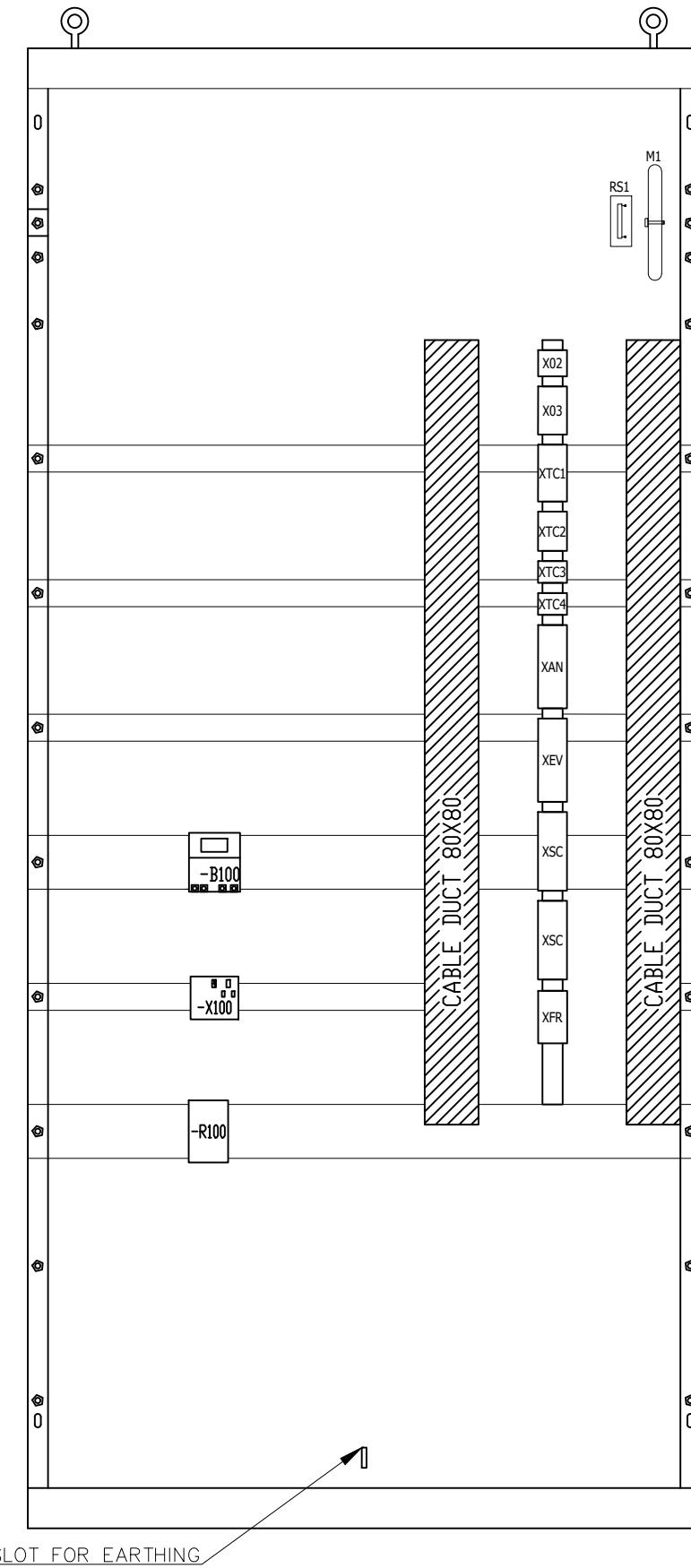
FRONT VIEW

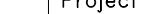


LEFT SIDE VIEW



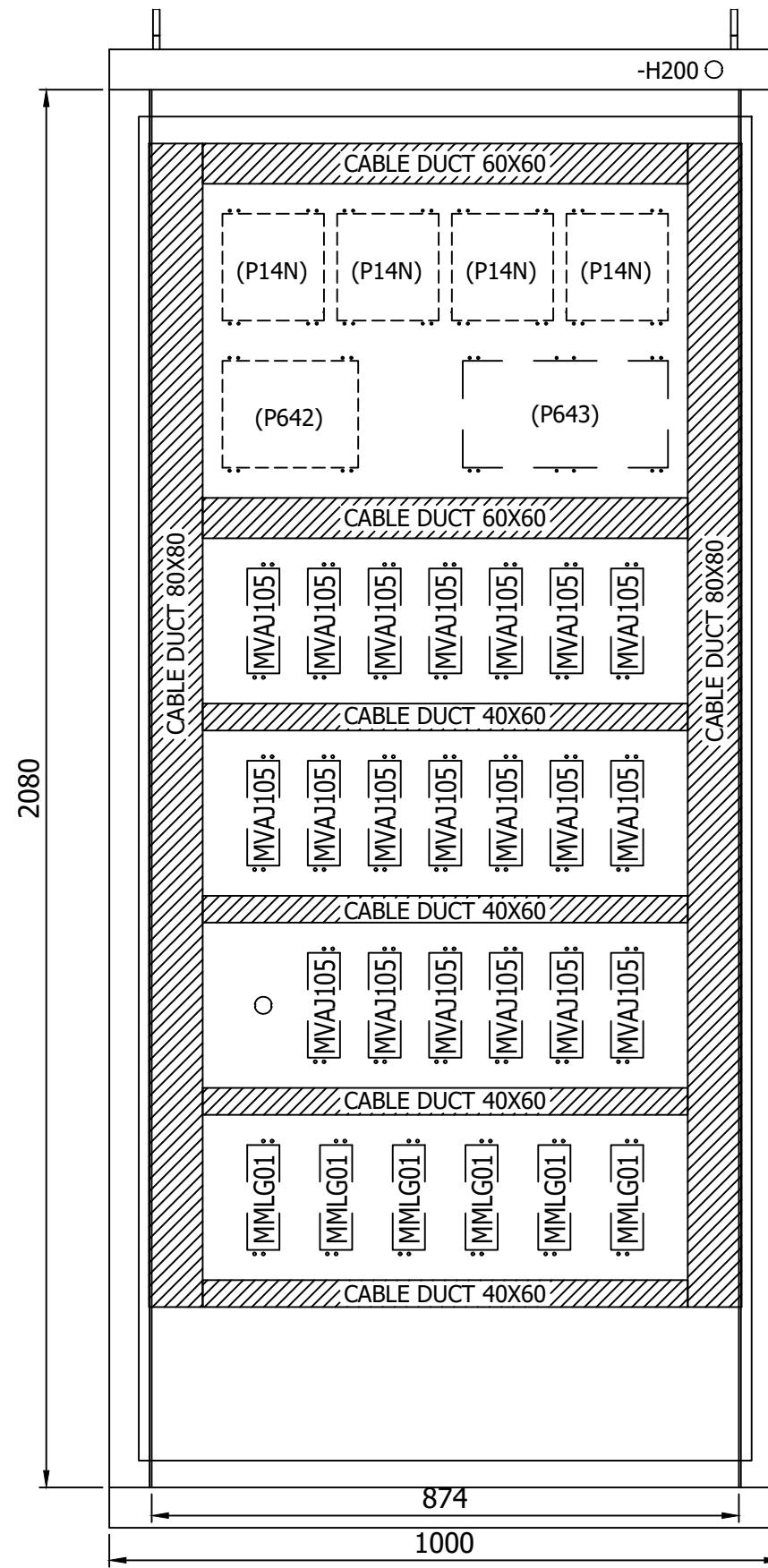
RIGHT SIDE VIEW



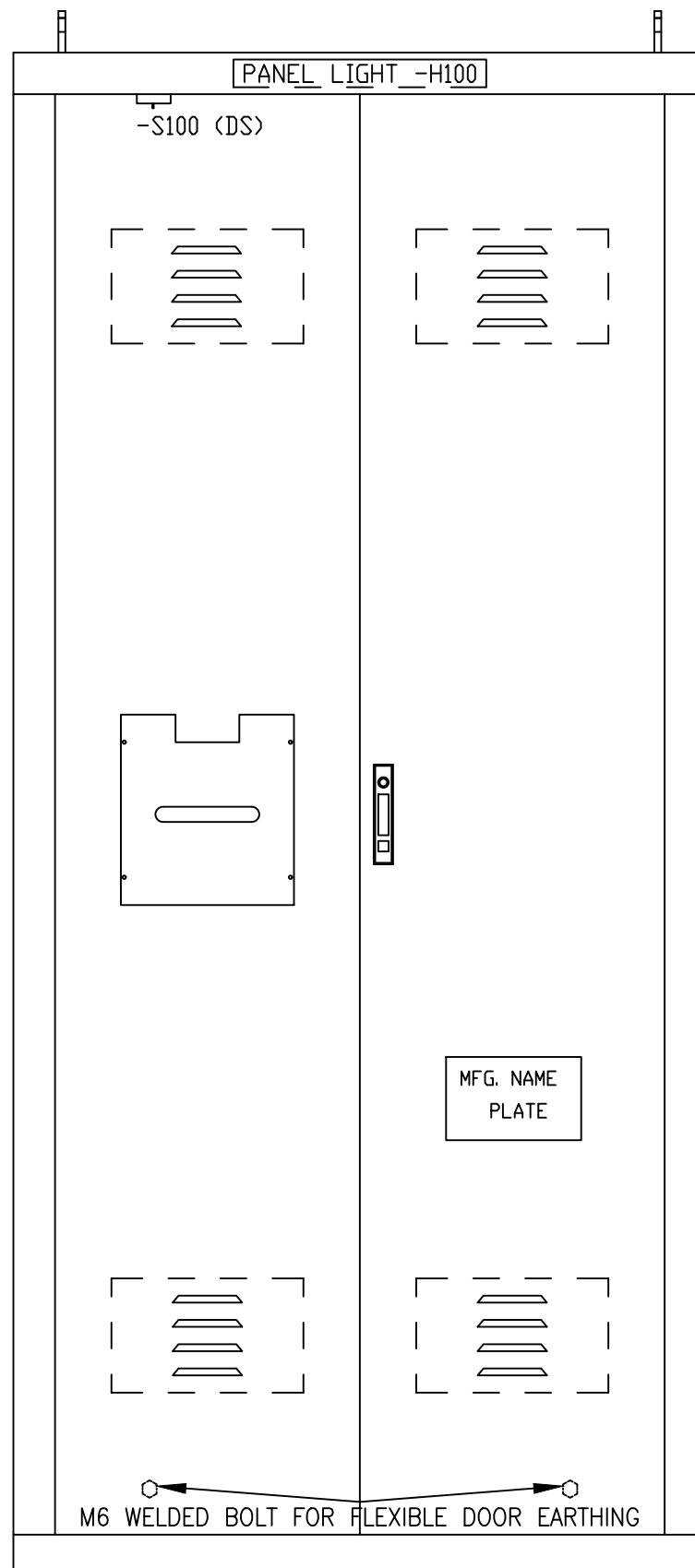
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								P60194-E-DTR-SC-003			
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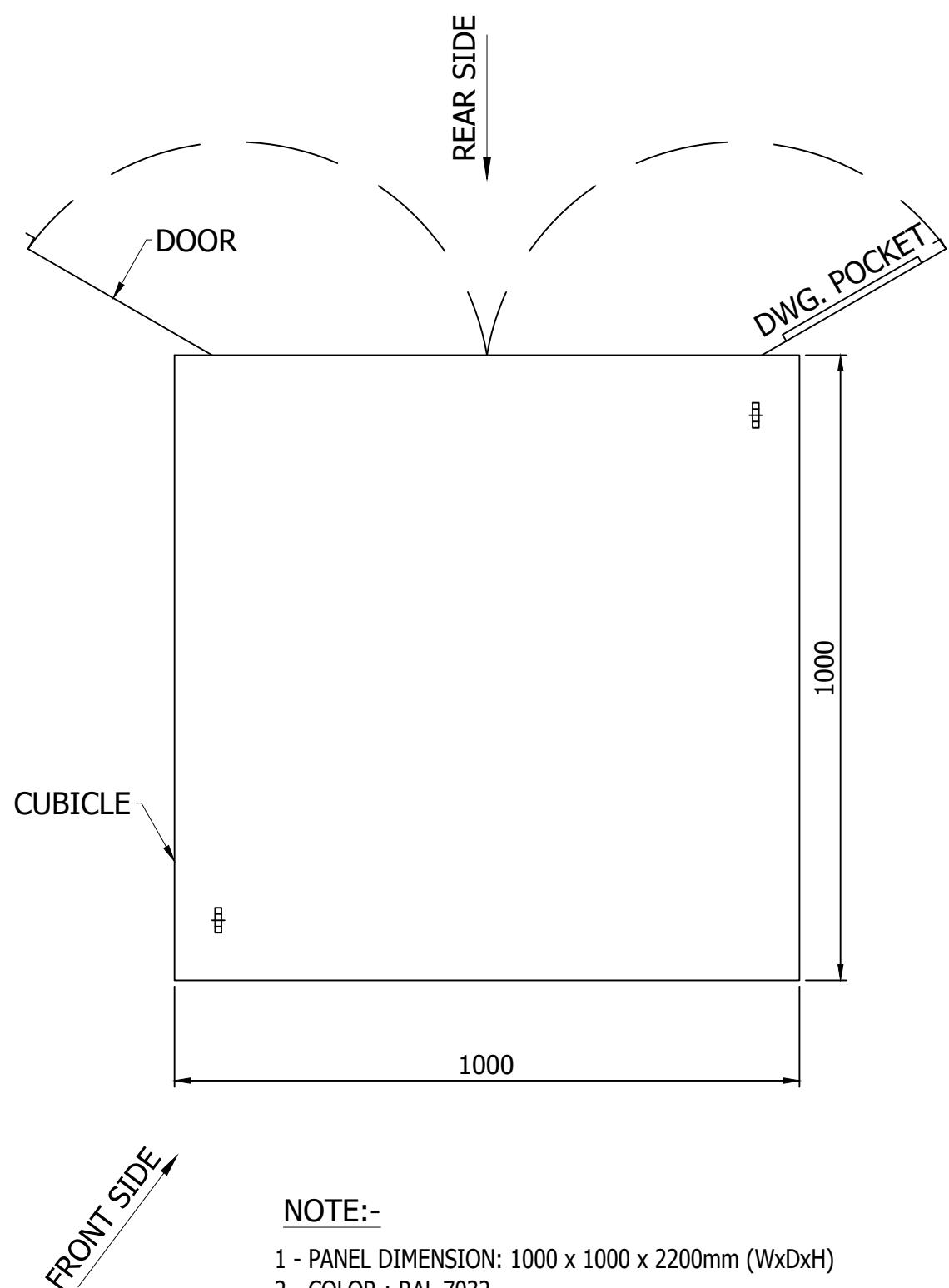
FRONT VIEW



BACK VIEW WITH DOOR



TOP VIEW

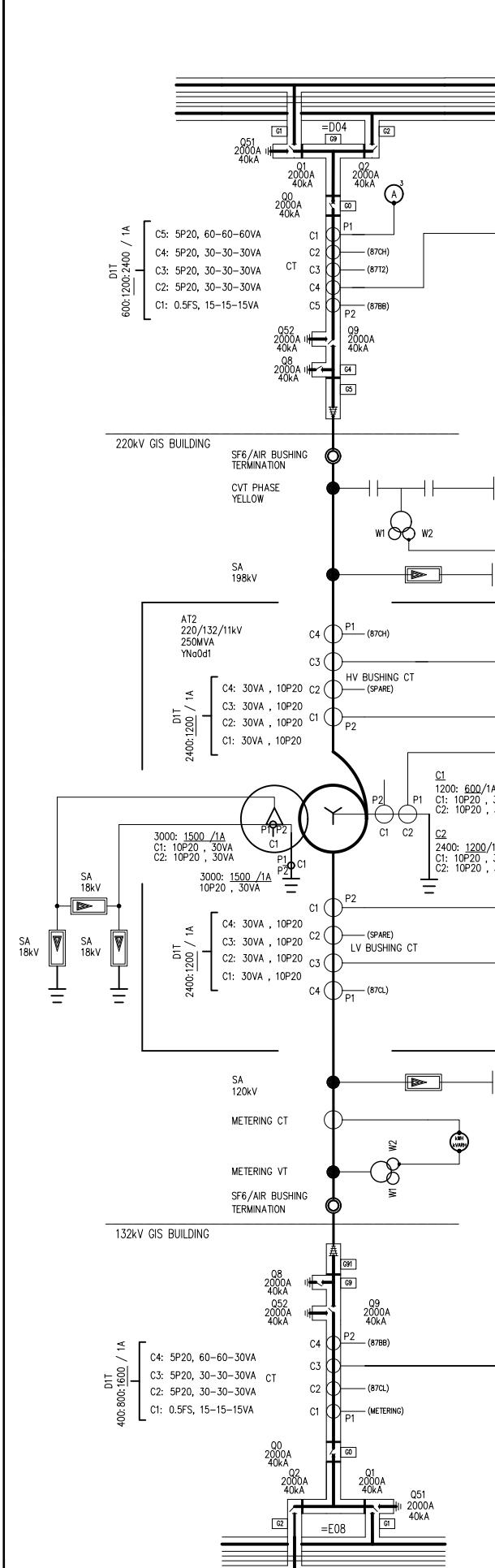


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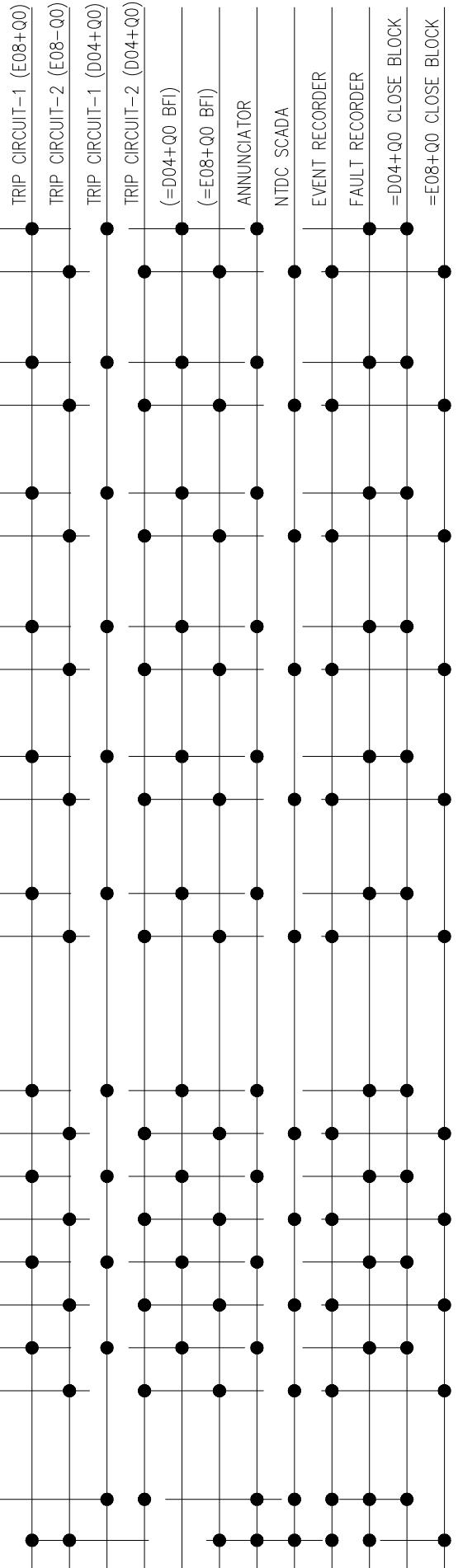
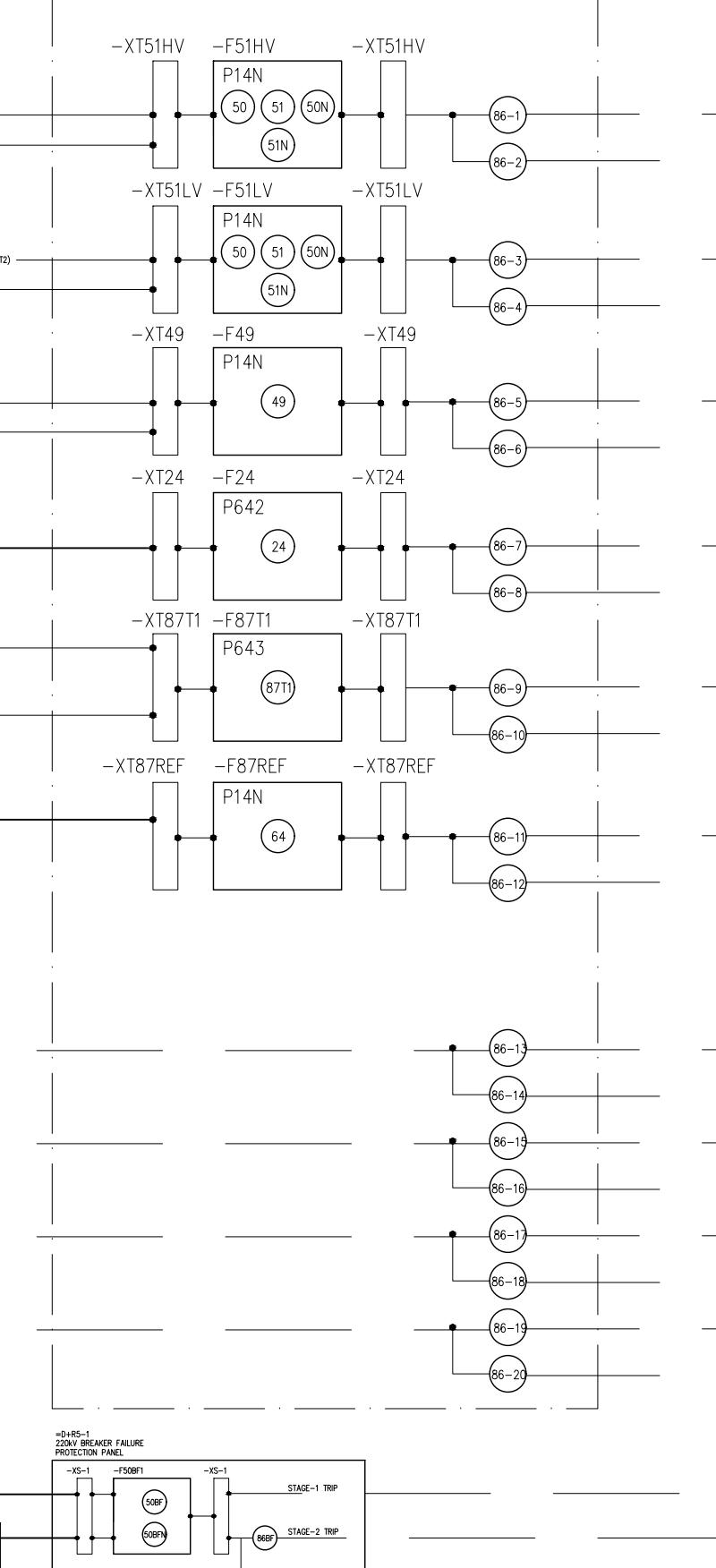
- 1 - PANEL DIMENSION: 1000 x 1000 x 2200mm (WxDxH)
 - 2 - COLOR : RAL 7032
 - 3 - SHEET THICKNESS : 2-2.5 mm
 - 4- PROTECTION CLASS : IP-51 (INDOOR TYPE)
 - 5 - ALL DOOR FITTED WITH 16mm EARTH STRAP & INSULATED WITH GREEN-YELLOW COLOUR.

0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) PANEL VIEW	Drawing no. P60194-E-DTR-SC-003		
									Project no.	Sheet type	
REV.	DESCRIPTION	DATE	DRAWER						P-60194	AD	05

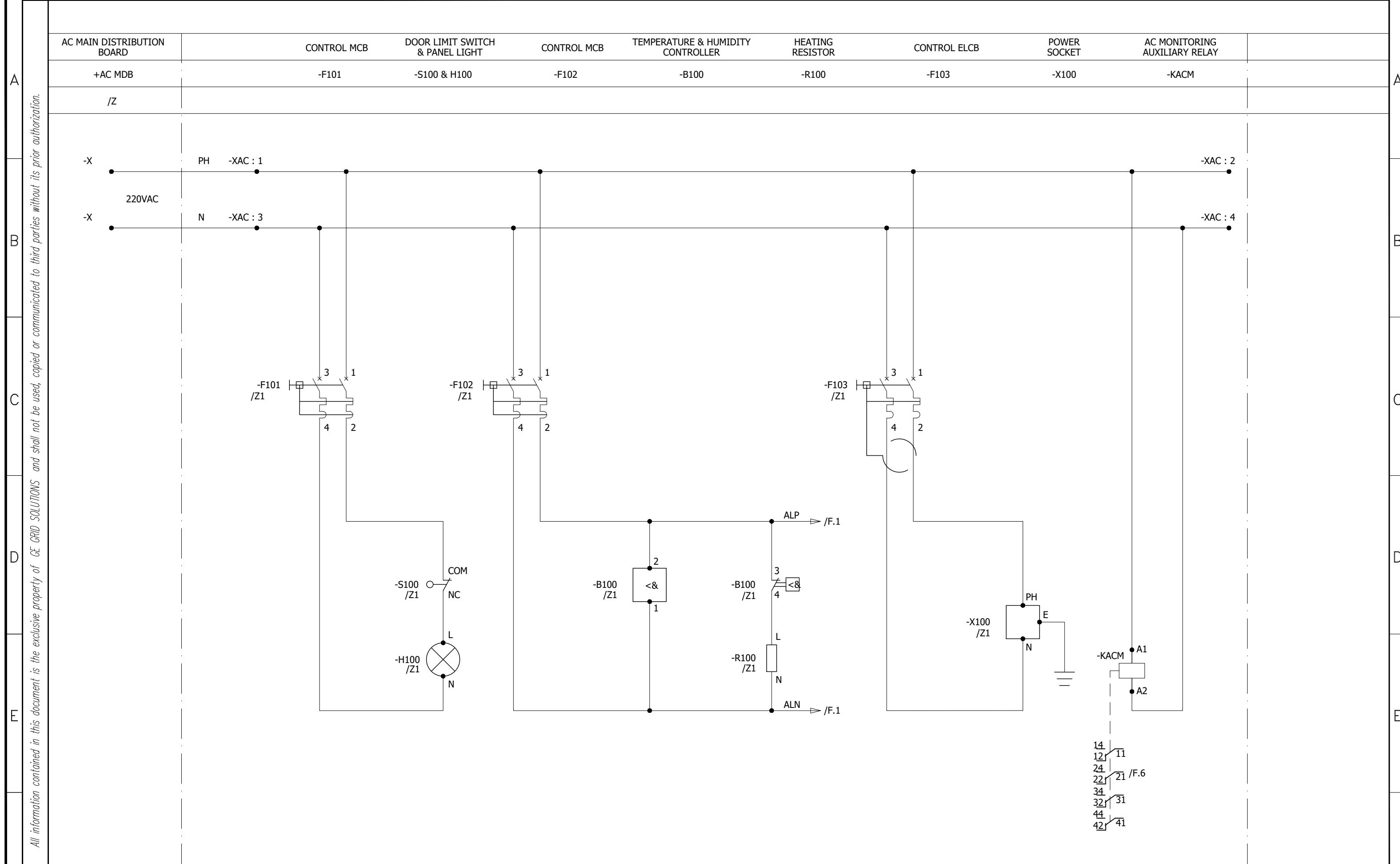
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=D04+R3
220kV TRANSFORMER RELAY PANEL (SET-1)



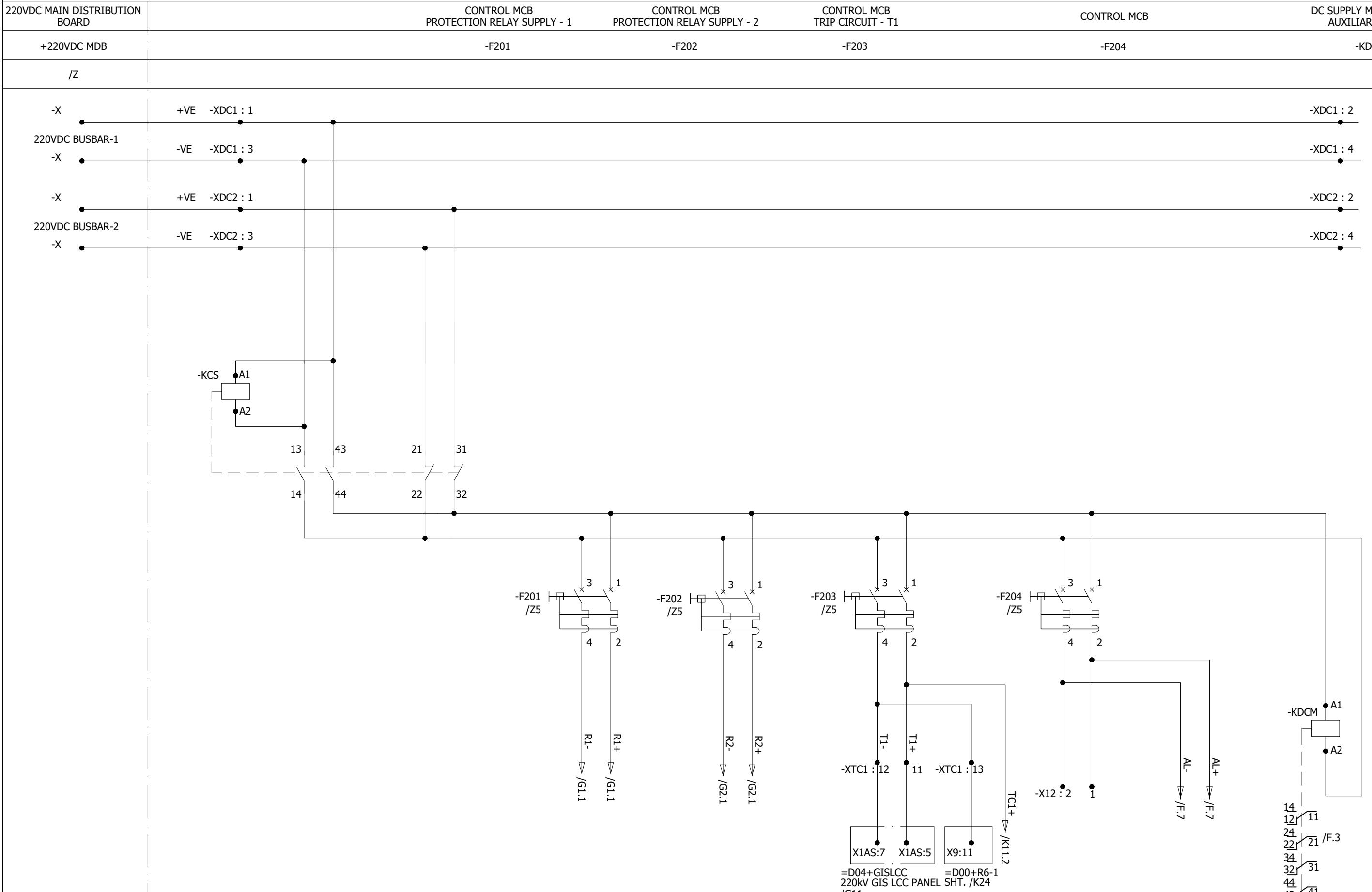
0	AS BUILT	22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPESOL	Grid Solutions	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV TRAFO RELAY SET-1 PANEL (=D09+R3) BAY CONCEPT & PROTECTION LOGICS	P60194-E-DTR-SC-003
									Project no. P-60194
									Sheet type AE
									Sheet no. 06
1			2						
3			4						
5			6						
7			8						



0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) AC SUPPLY DISTRIBUTION	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
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									Sheet no. 07

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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) DC SUPPLY DISTRIBUTION	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
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									Sheet no. 08

220V DC CIRCUIT FAULTY

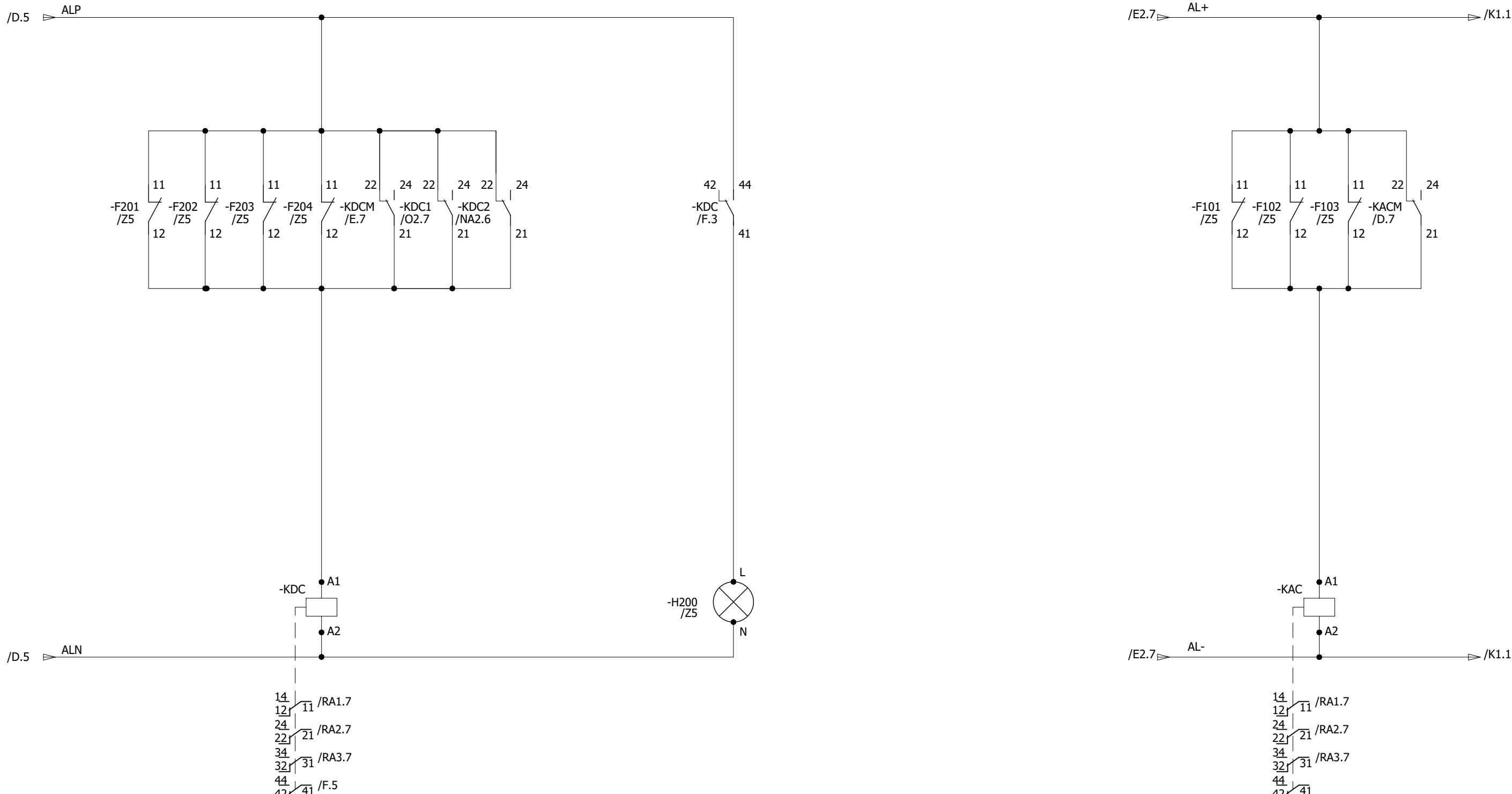
220V DC CIRCUIT FAULTY INDICATION

220V AC CIRCUIT FAULTY

-KDC

-H200

-KAC



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0	AS BUILT		22.11.2018	ASJ	Manufacturer  7-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV TRAFO RELAY SET-1 PANEL (=D09+R3) AC/DC SUPPLY FAILURE CIRCUIT	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION		DATE	DRAWER						Project no. P-60194	Sheet type F	Sheet no. 09
1	2	3	4	5	6	7	8					

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TRAFO DIFF. RELAY

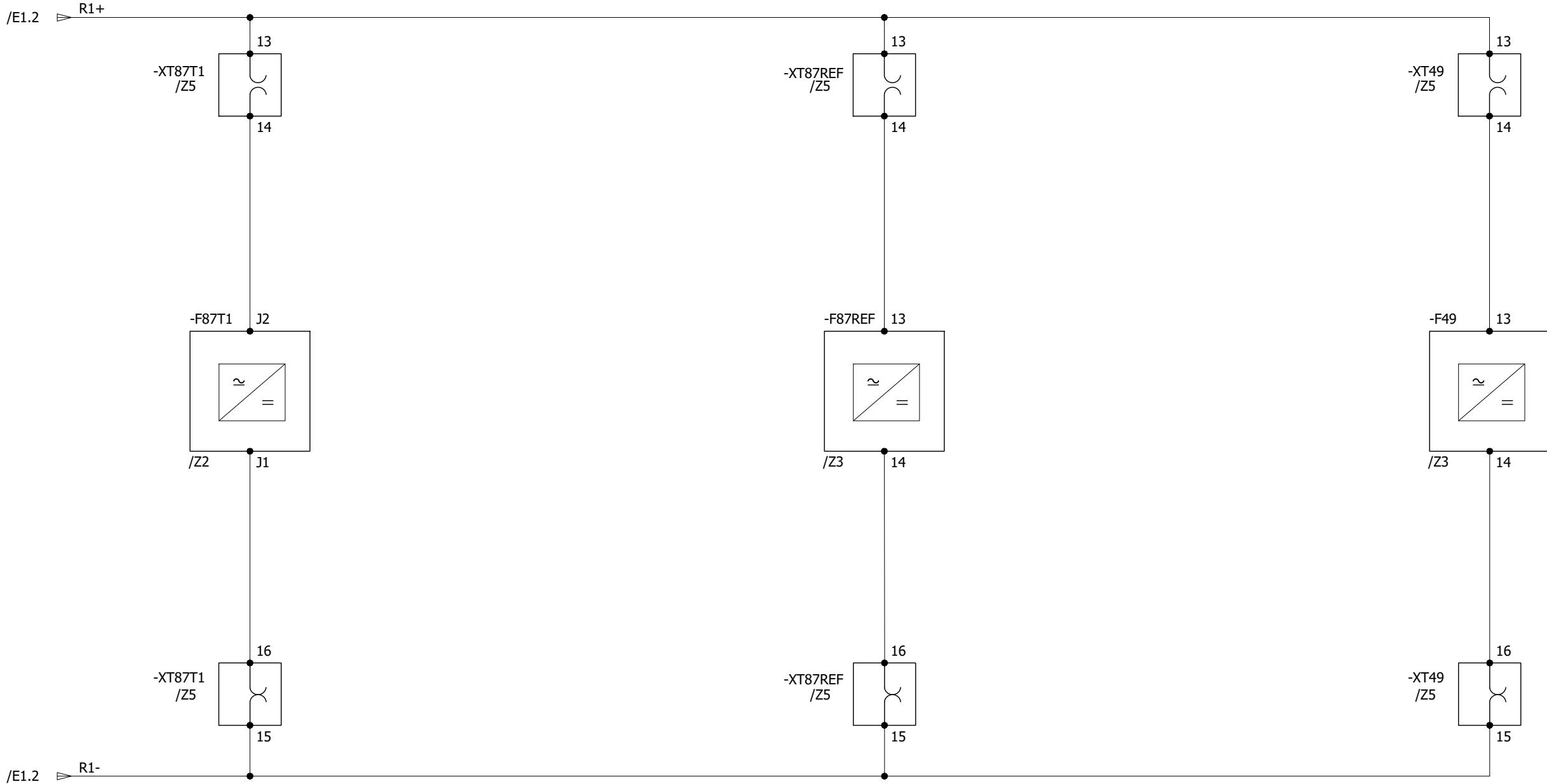
REF RELAY

THERMAL O/L RELAY

RELAY SUPPLY

RELAY SUPPLY

RELAY SUPPLY



0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) RELAY CONTROL & SUPPLY	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type G1
									Sheet no. 10

OVER EXCITATION RELAY

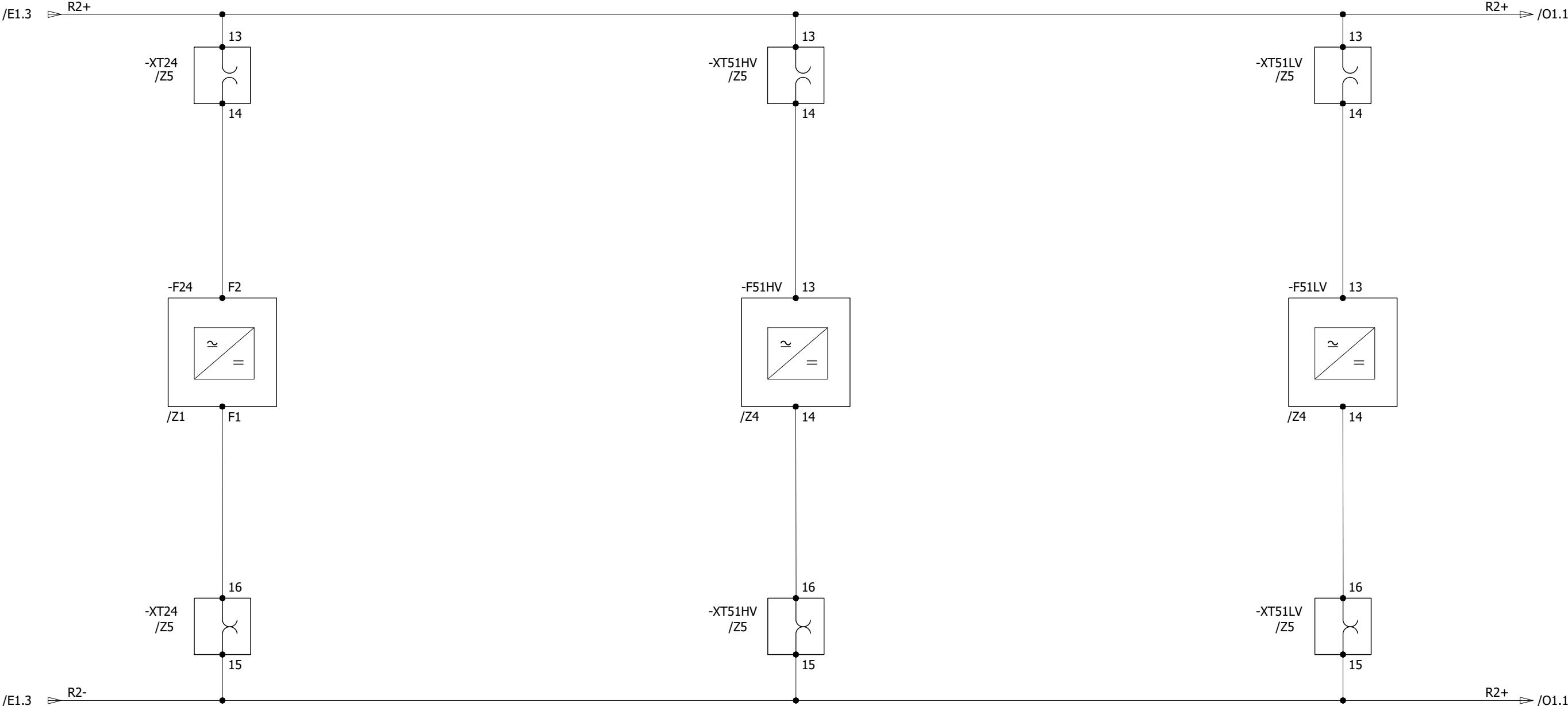
RELAY SUPPLY

HV OC/EF RELAY

RELAY SUPPLY

LV OC/EF RELAY

RELAY SUPPLY



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A
B
C
D
E
F

A
B
C
D
E
F

0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) RELAY CONTROL & SUPPLY	P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194

TEST BLOCK

TRAFO DIFFERENCE PROTECTION
RELAY

-XT87T1

-F87T1

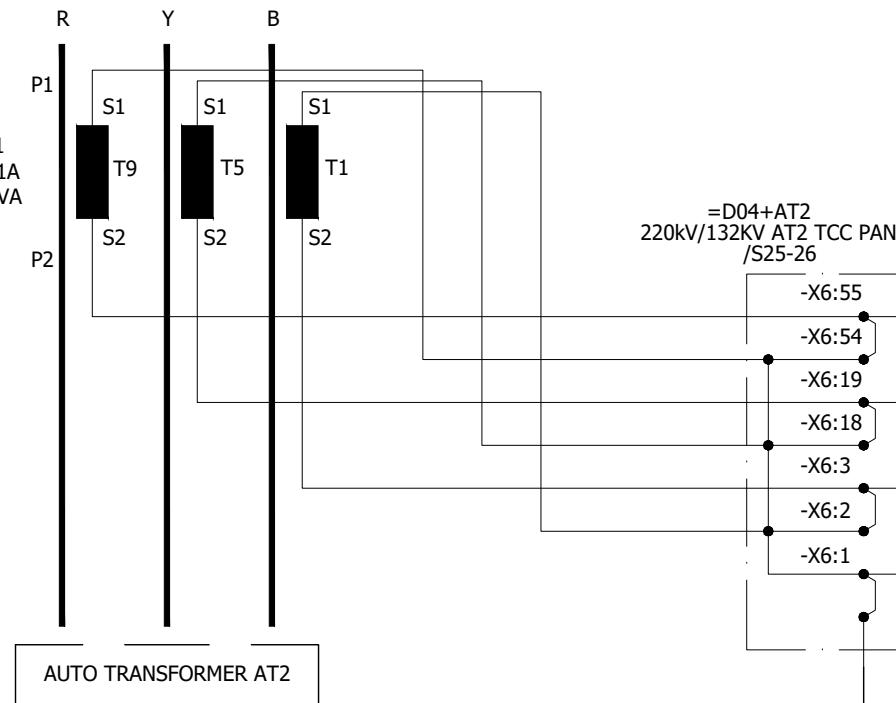
/Z5

/Z2

CONTROL ROOM

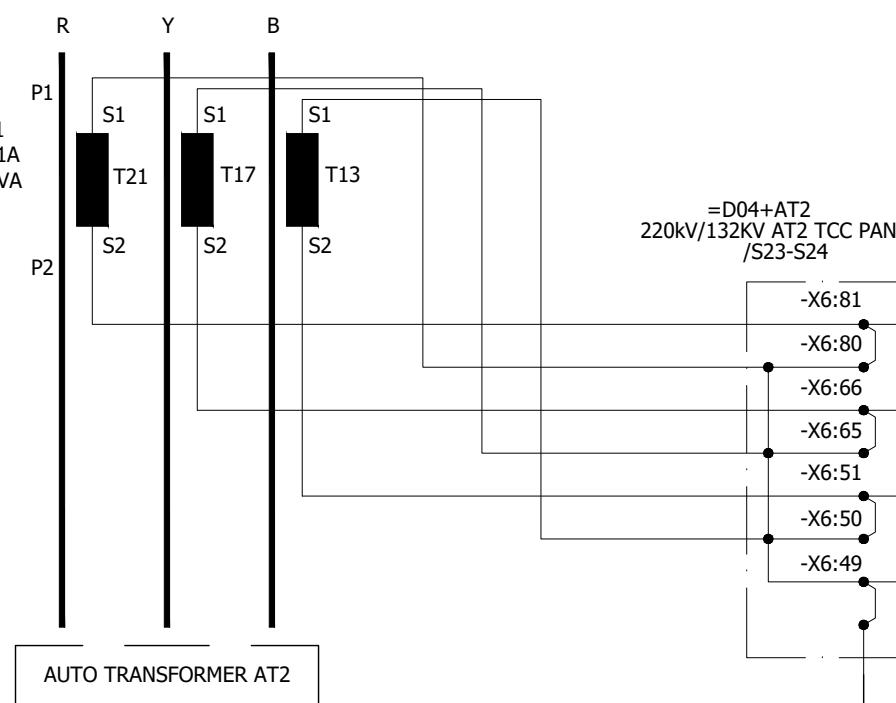
HV SIDE BUSHING CT

AT2 CORE-1
2400:1200 / 1A
Cl. 10P20, 30VA



LV SIDE BUSHING CT

AT2 CORE-1
2400:1200 / 1A
Cl. 10P20, 30VA



CONTROL ROOM

-XT87T1

-F87T1

21

22

23

24

25

26

27

28

1

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AGILE P643 TRANSFORMER DIFFERENTIAL PROTECTION RELAY

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0	AS BUILT	22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
				EPESEL  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	220kV TRAFO RELAY SET-1 PANEL (=D09+R3) TRAFO DIFFERENTIAL PROTECTION CT CIRCUIT	P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type H1	Sheet no. 12

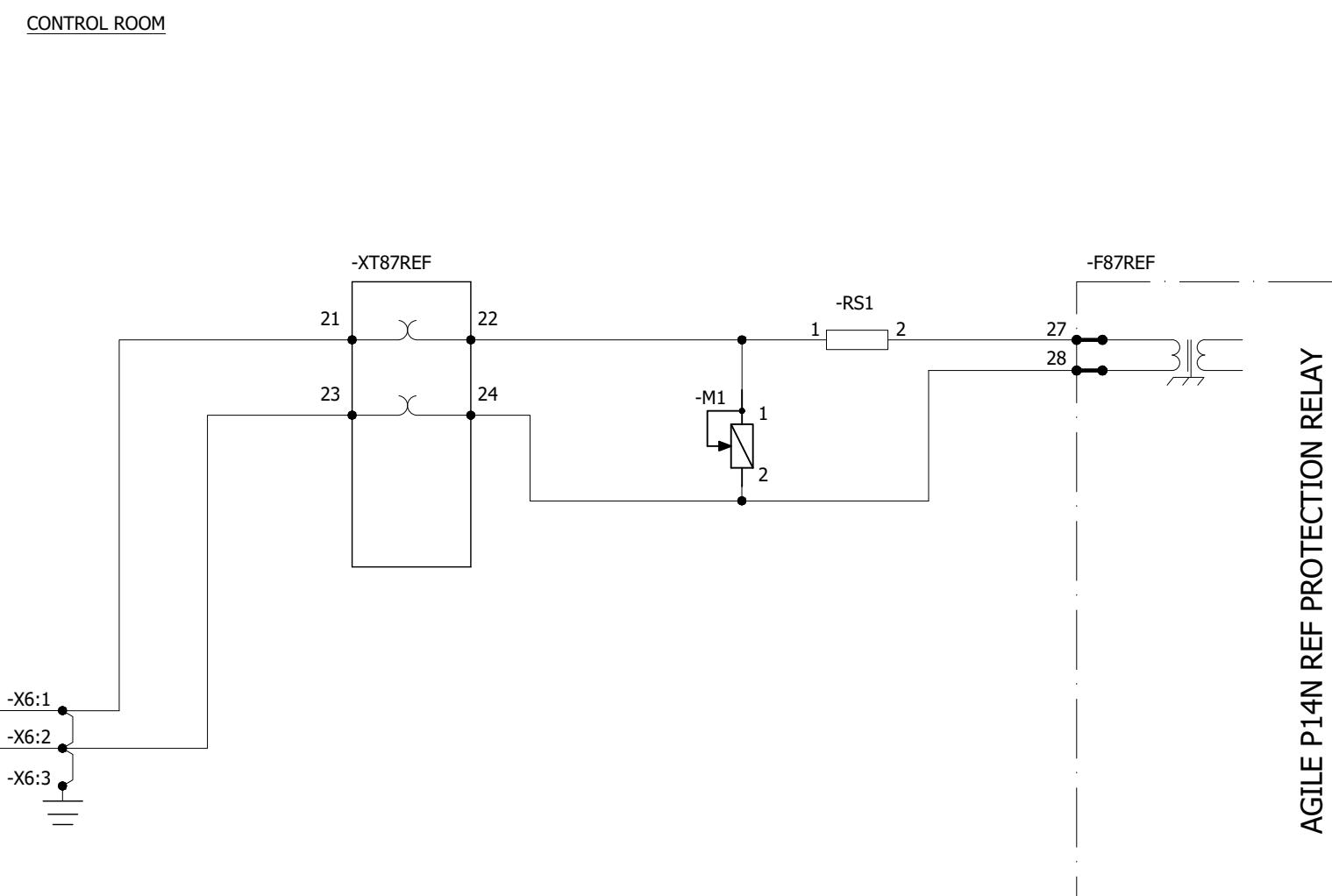
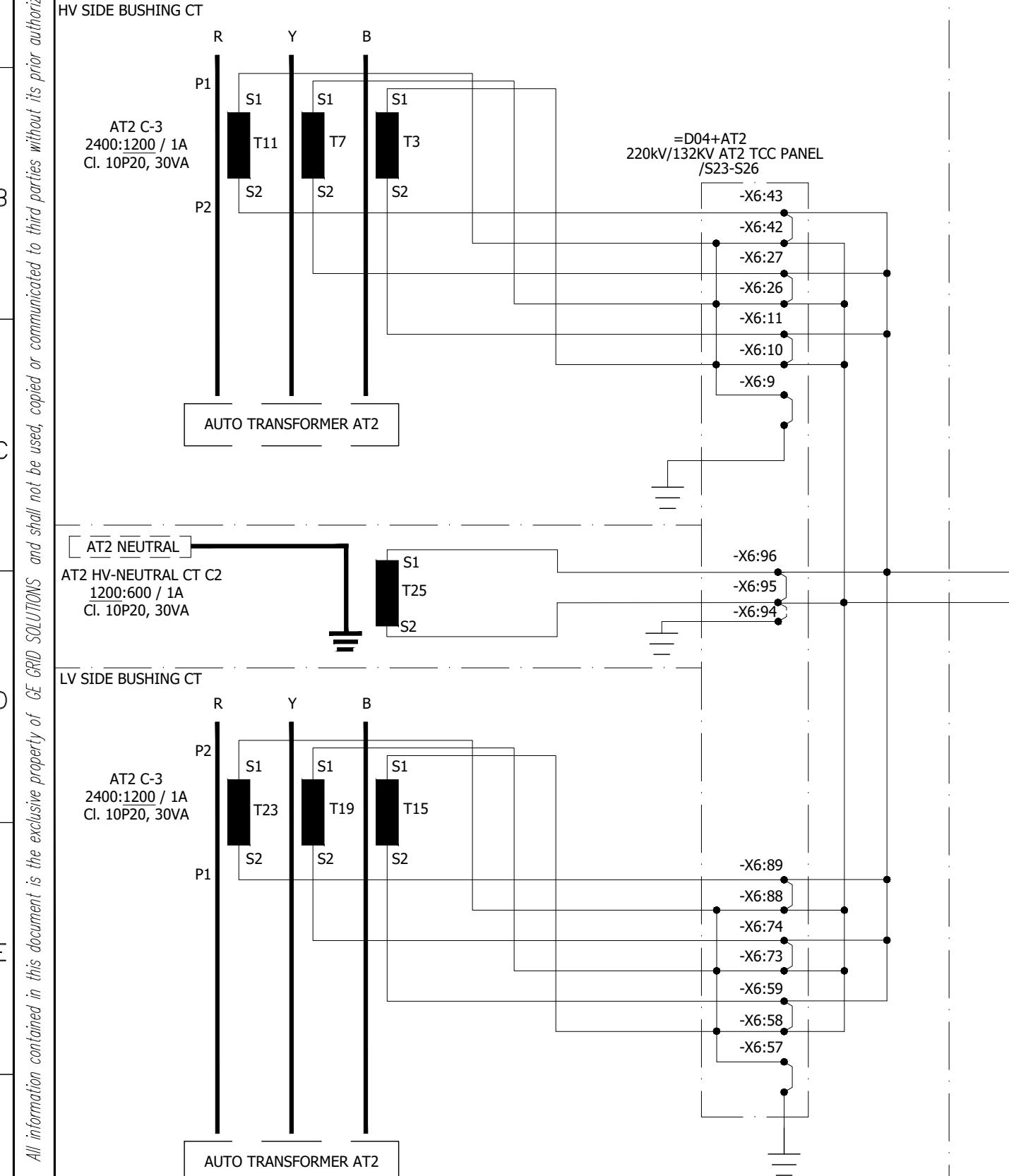
1 2 3 4 5 6 7 8

TEST BLOCK MTEROSIL LIMITING RESISTOR RESTRICTED EARTH FAULT RELAY

-XT87 -M1 -RS1 -F87REF

/Z5 /Z3

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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) REF PROTECTION CT CIRCUIT	P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type H2 Sheet no. 13

1 2 3 4 5 6 7 8

132kV GIS LCC
PANEL

=E08

/MA1

TEST BLOCK

THERMAL OVERLOAD
RELAY

-XT49

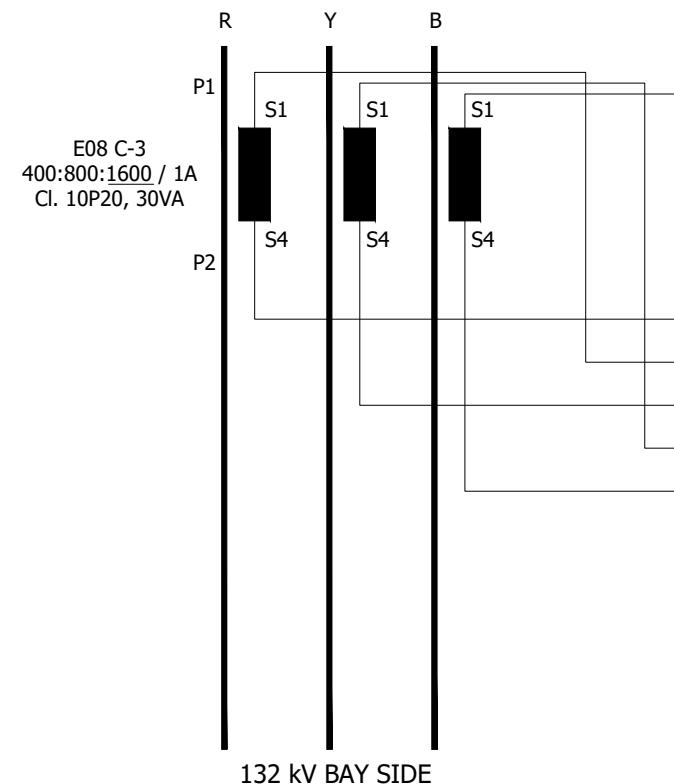
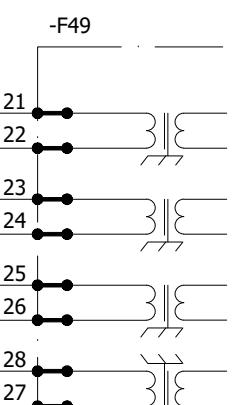
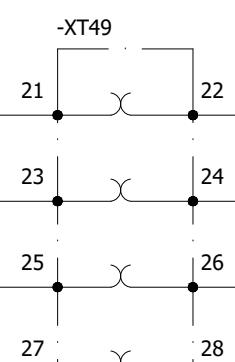
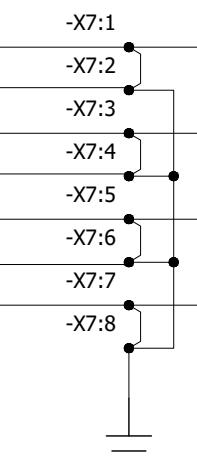
-F49

/Z5

/Z3

LV TRAFO SIDE

132kV GIS HALL CONTROL ROOM

=E08+GIS LCC
132kV GIS LCC PANEL
/S11

AGILE P14N THERMAL OVERLOAD PROTECTION RELAY

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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) THERMAL OVERLOAD RELAY CT INPUTS	Drawing no. P60194-E-DTR-SC-003	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type H3	Sheet no. 14

220kV CVT TRAFO SIDE
PANEL

=D04 + CVT KIOSK

/MA1

TEST BLOCK

OVER EXCITATION
RELAY

-XT24

-F24

/Z1

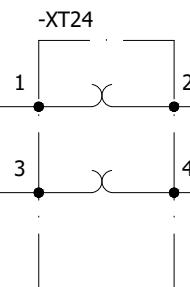
CONTROL ROOM

=CVT KIOSK
RY PHASE
/S81



-X01:1

-X01:2



-XT24

3

1

2

4

-F24



AGILE P642 OVER EXCITATION PROTECTION RELAY

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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) OVER EXCITATION RELAY VT INPUTS	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type H4	Sheet no. 15

220kV GIS LCC
PANEL

=D04

/MA1

TEST BLOCK

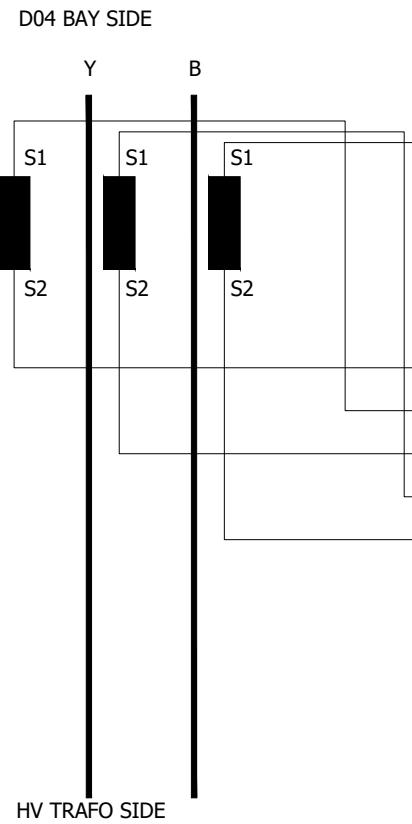
HV OCP/EFP
RELAY

-XT51HV

-F51HV

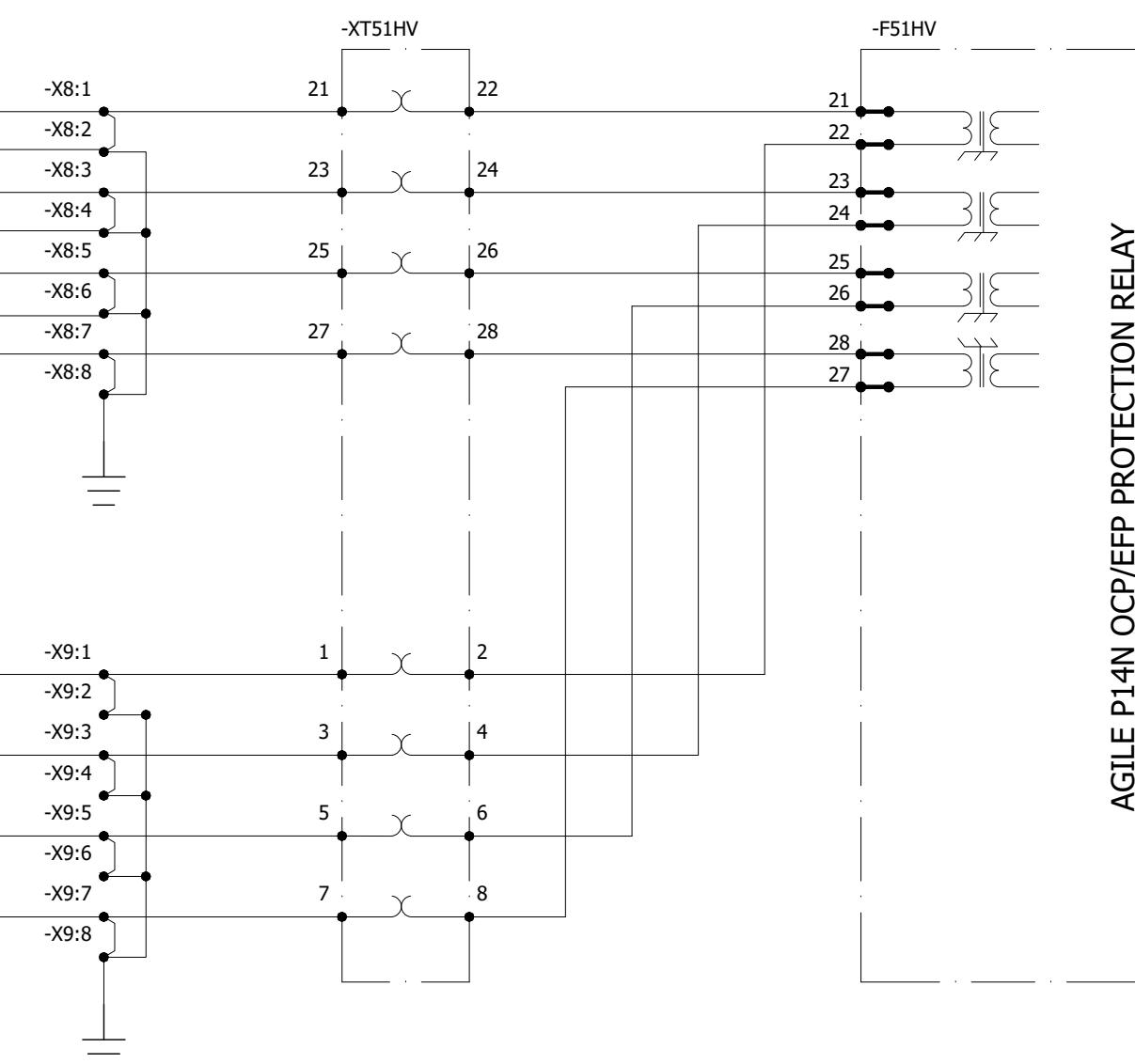
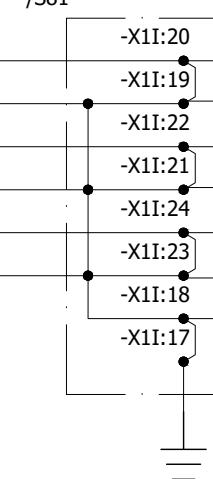
/Z5

/Z4



220kV GIS HALL CONTROL ROOM

=D04+GISLCC
220kV GIS LCC PANEL
/S81



AGILE P14N OCP/EFP PROTECTION RELAY

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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) HV OCP/EFP RELAY CT INPUTS	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194

TEST BLOCK

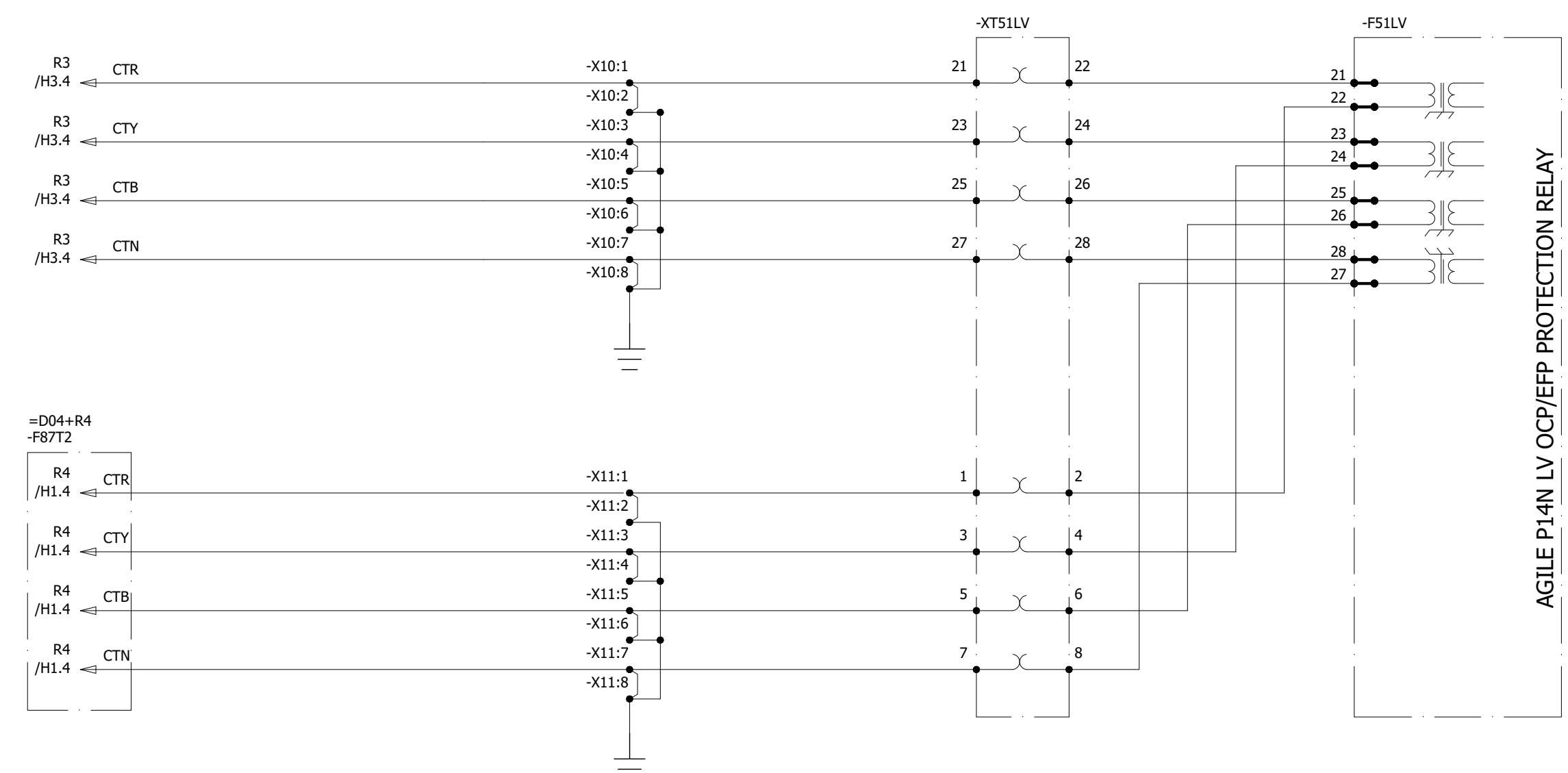
LV OCP/EFP
RELAY

-XT51LV

-F51LV

/Z5

/Z4



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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) LV OCP/EFP RELAY CT INPUTS	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type H6	Sheet no. 17

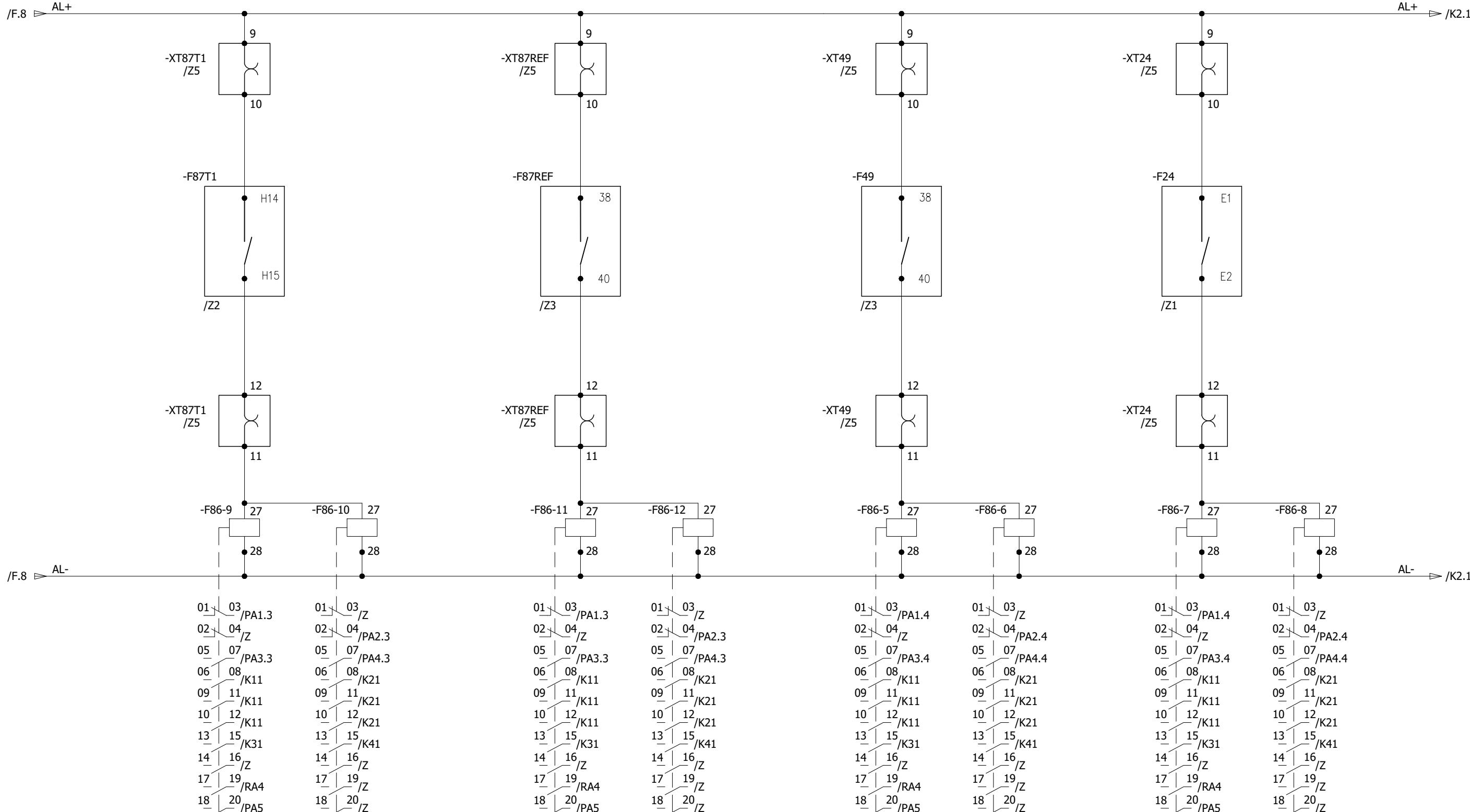
DIFFERENTIAL PROTECTION TRIP

REF PROTECTION TRIP

THERMAL OVERLOAD PROTECTION TRIP

OVER EXCITATION PROTECTION TRIP

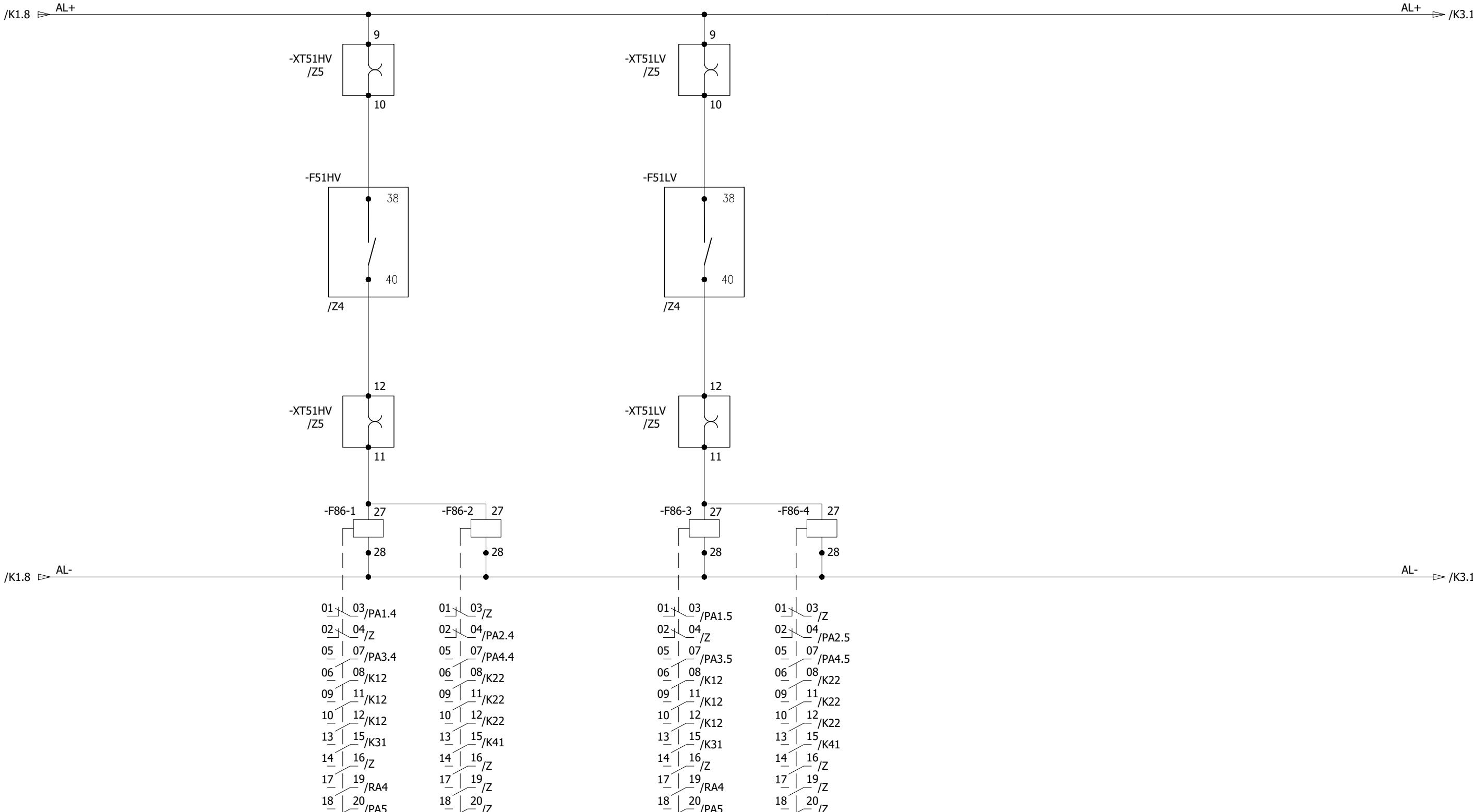
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0	AS BUILT	22.11.2018	ASJ	Manufacturer EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION TRIPS	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K1
									Sheet no. 18

HV OC/EF PROTECTION TRIP

LV OC/EF PROTECTION TRIP



0 AS BUILT 22.11.2018 ASJ Manufacturer E PESOL 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 TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION TRIPS

Drawing no. P60194-E-DTR-SC-003

Project no. P-60194

Sheet type K2

Sheet no. 19

OIL TEMP. HV TRIP

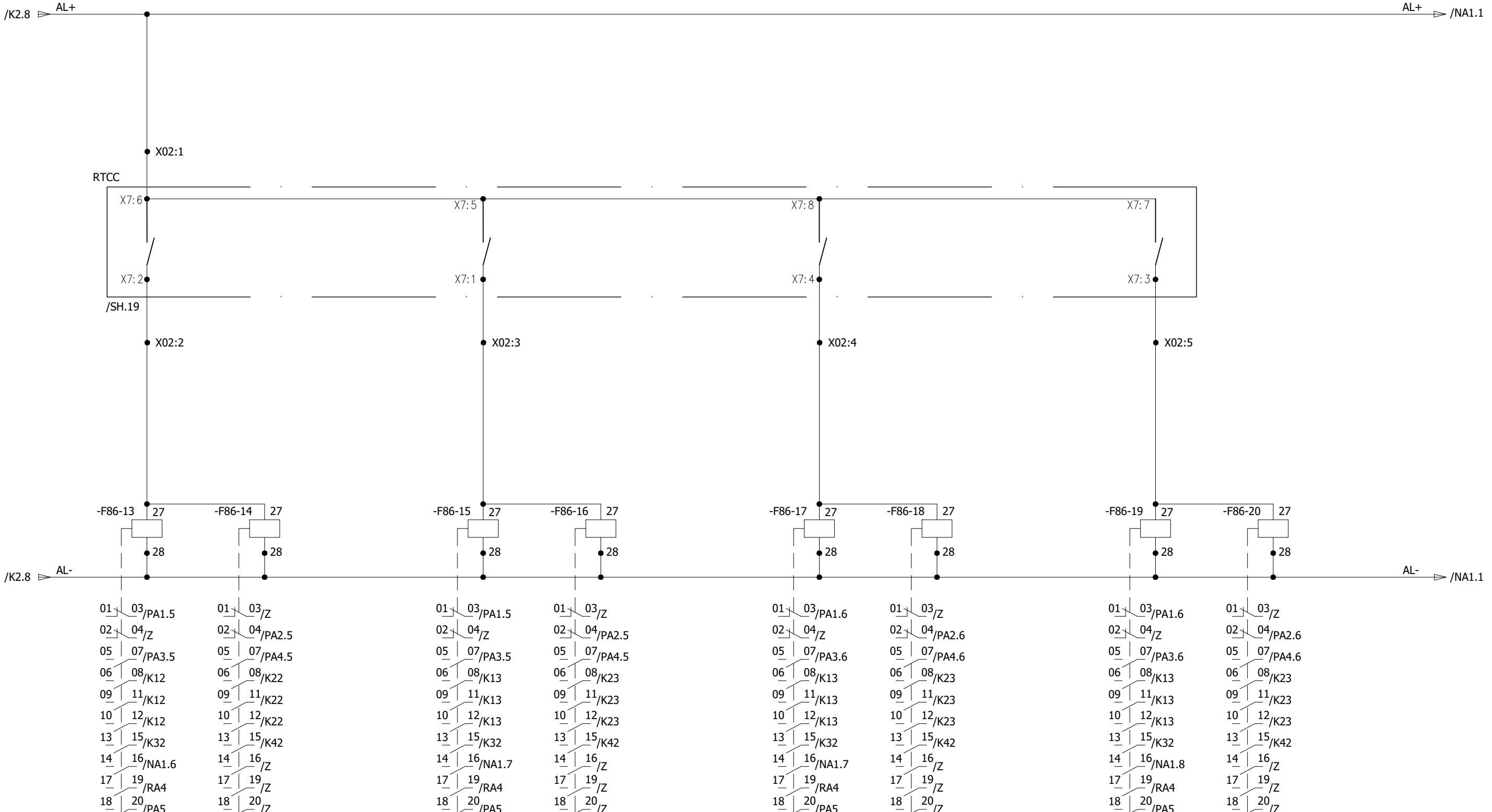
OIL TEMP. LV TRIP

WINDING TEMP. HV TRIP

WINDING TEMP. LV TRIP

DC MONITORING

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220KV GIS LCC
PANEL

TRAFO DIFFERENTIAL PROTECTION SET-1 TRIPS

REF PROTECTION TRIP

THERMAL OVERLOAD PROTECTION TRIP

OVER EXCITATION PROTECTION TRIPS

=D04+GISLCC

R-PH Y-PH B-PH

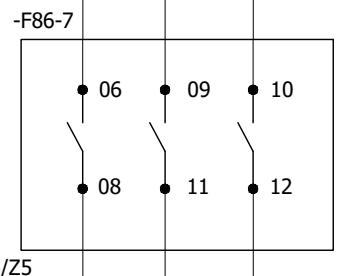
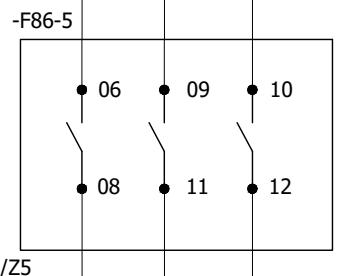
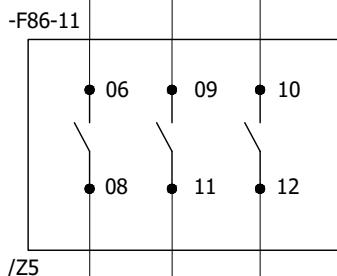
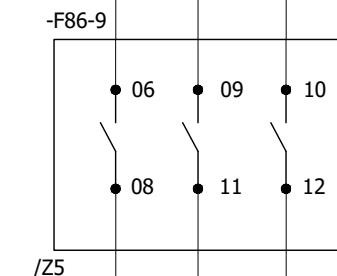
R-PH Y-PH B-PH

R-PH Y-PH B-PH

R-PH Y-PH B-PH

/L52

-XTC1 : 1 /E.5 => TC1+ /K12.2



-X0 : 13 -XTC1 : 2

-X0 : 14 -XTC1 : 3

-X0 : 15 -XTC1 : 4

-X0 : 13 -XTC1 : 2

-X0 : 14 -XTC1 : 3

-X0 : 15 -XTC1 : 4

-X0 : 13 -XTC1 : 2 /K12.2

-X0 : 14 -XTC1 : 3 /K12.2

-X0 : 15 -XTC1 : 4 /K12.2

A

A

B

B

C

C

D

D

E

E

F

F

0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR COIL - 1	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K11
									Sheet no. 21

A

HV OC/EF PROTECTION TRIPS

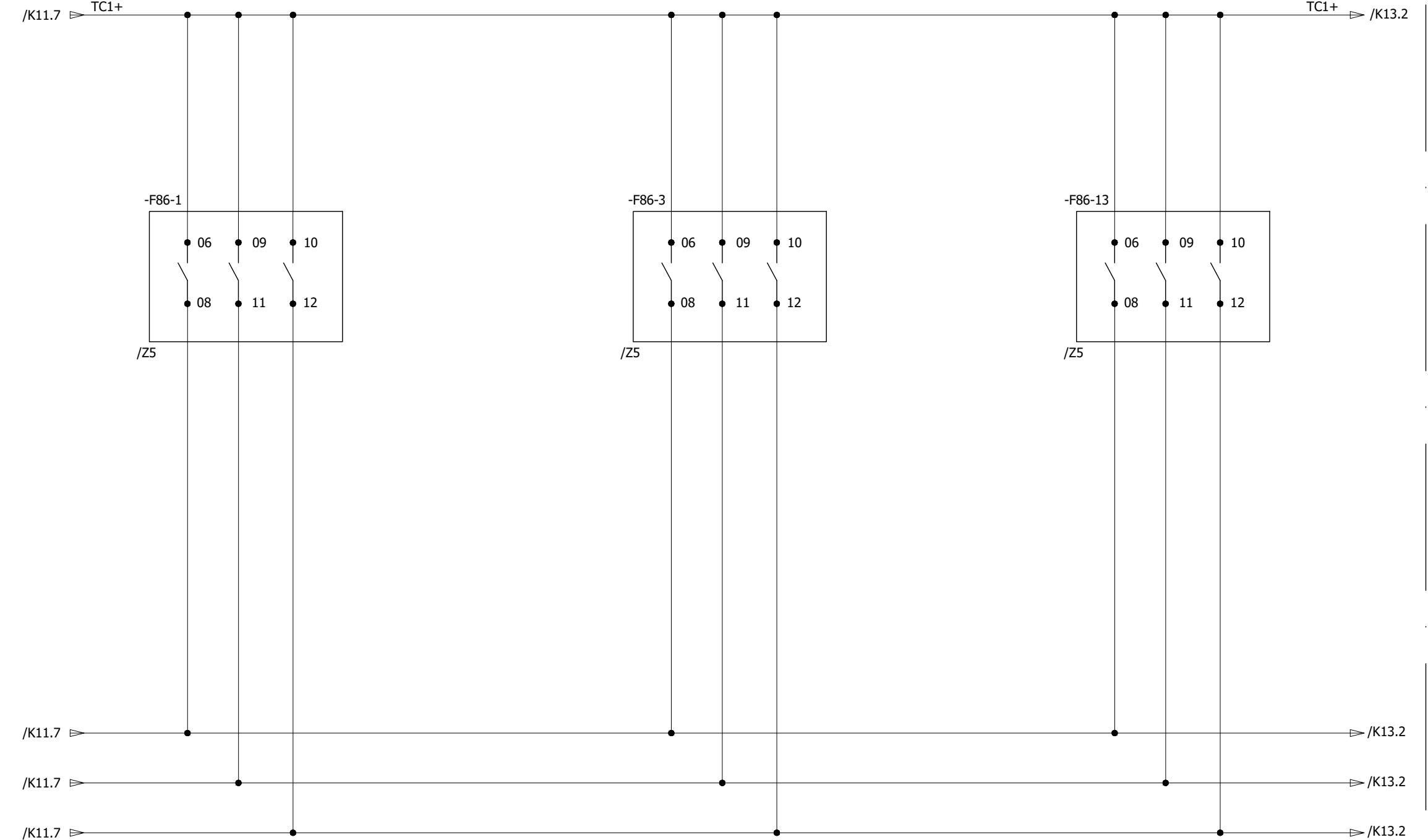
LV OC/EF PROTECTION TRIPS

OIL TEMP. HV TRIPS

R-PH Y-PH B-PH

R-PH Y-PH B-PH

R-PH Y-PH B-PH



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F

E

D

C

B

A

A

B

C

D

E

F

0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR COIL - 1	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K12
									Sheet no. 22

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OIL TEMP. LV TRIP

WINDING TEMP. HV TRIPS

WINDING TEMP. LV TRIPS

220kV TRAFO RELAY PANEL SET-2

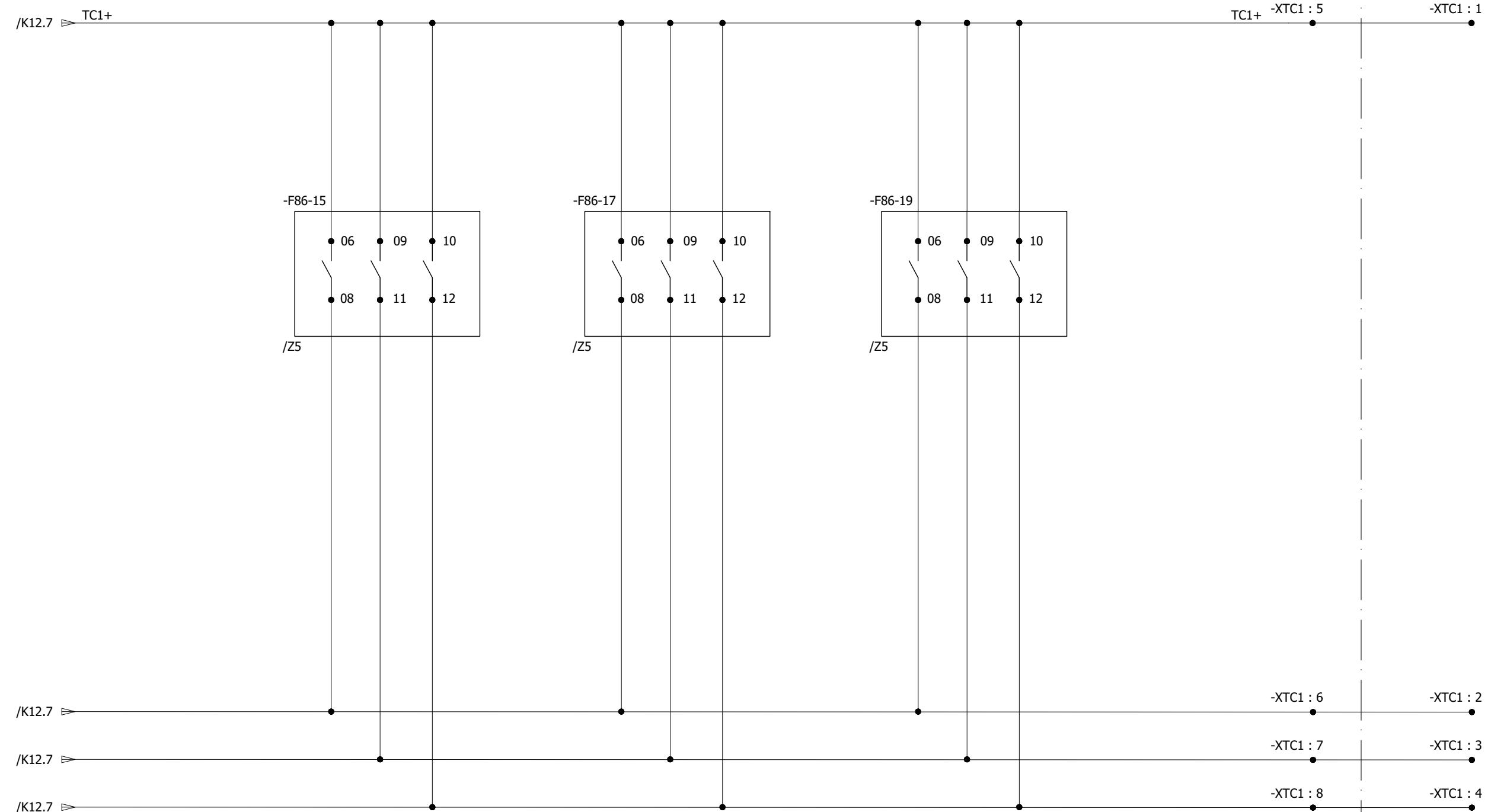
R-PH Y-PH B-P

R-PH Y-PH B-PH

R-PH Y-PH B-PH

=D04+R4

/K11



0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR COIL - 1	Drawing no. P60194-E-DTR-SC-003	
									Project no. P-60194	
REV.	DESCRIPTION	DATE	DRAWER						Sheet type K13	Sheet no. 23

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220KV TRAFO RELAY PANEL
SET-2

TRAFO DIFFERENTIAL PROTECTION SET-1 TRIPS

REF PROTECTION TRIP

THERMAL OVERLOAD PROTECTION TRIP

OVER EXCITATION PROTECTION TRIPS

=D04+R4

R-PH Y-PH B-PH

R-PH Y-PH B-PH

R-PH Y-PH B-PH

R-PH Y-PH B-PH

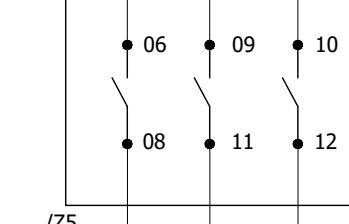
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A

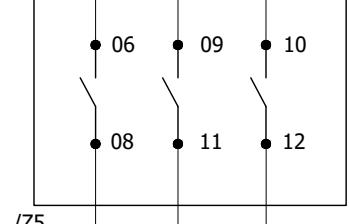
-XTC2 : 5 +TC2 -XTC2 : 1 TC2+ /K22.2

B

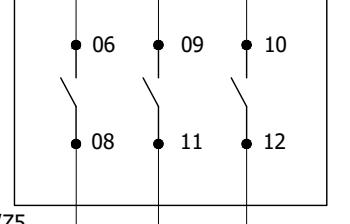
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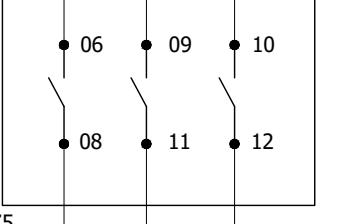
-F86-12



-F86-6



-F86-8



-XTC2 : 6 -XTC2 : 2 TC2+ /K22.2

-XTC2 : 7 -XTC2 : 3 TC2+ /K22.2

-XTC2 : 8 -XTC2 : 4 TC2+ /K22.2

B

C

D

E

F

A

F

0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR COIL - 2	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K21
									Sheet no. 24

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HV OC/EF PROTECTION TRIPS

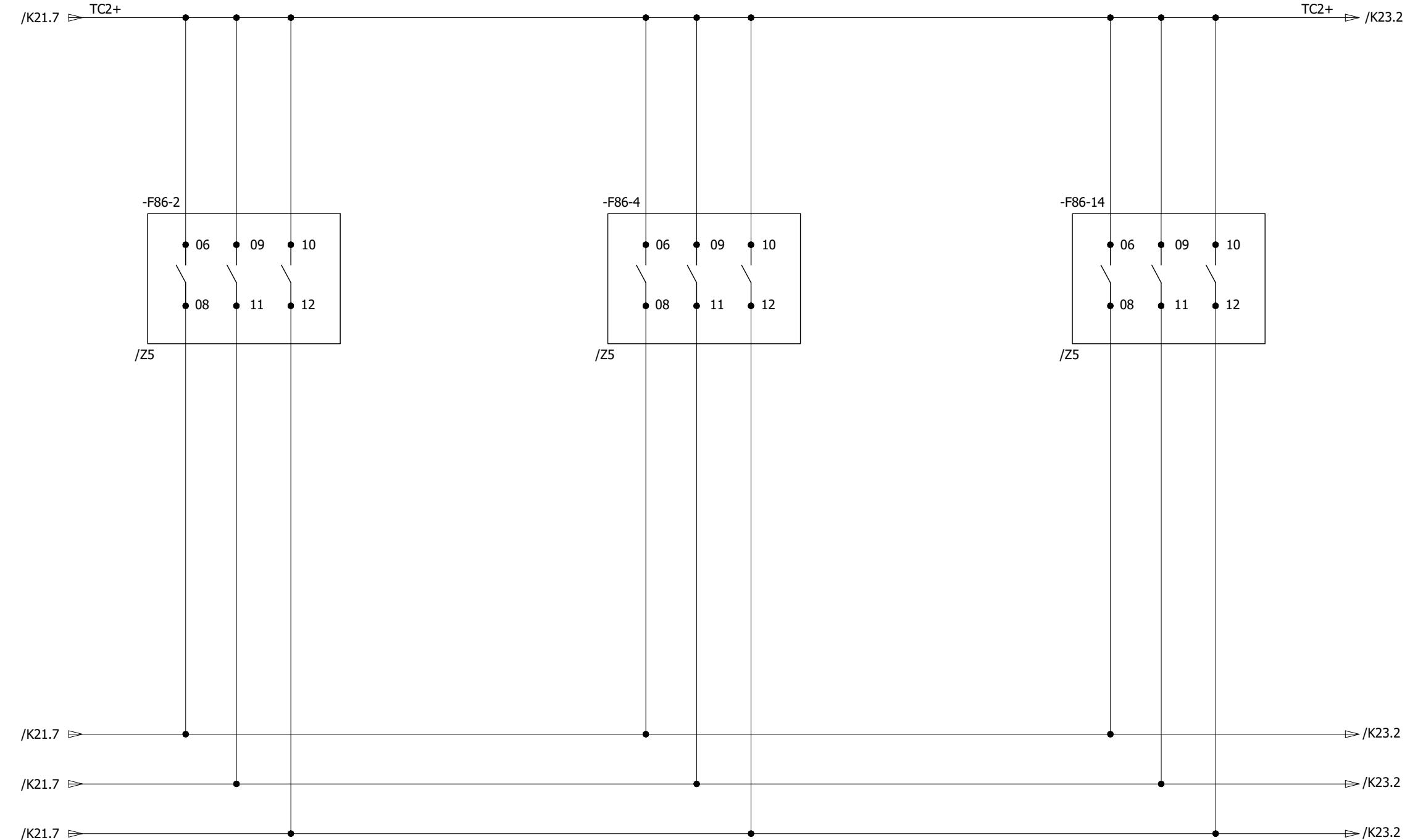
R-PH Y-PH B-PH

LV OC/EF PROTECTION TRIPS

R-PH Y-PH B-PH

OIL TEMP. HV TRIPS

R-PH Y-PH B-PH



A

A

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B

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C

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E

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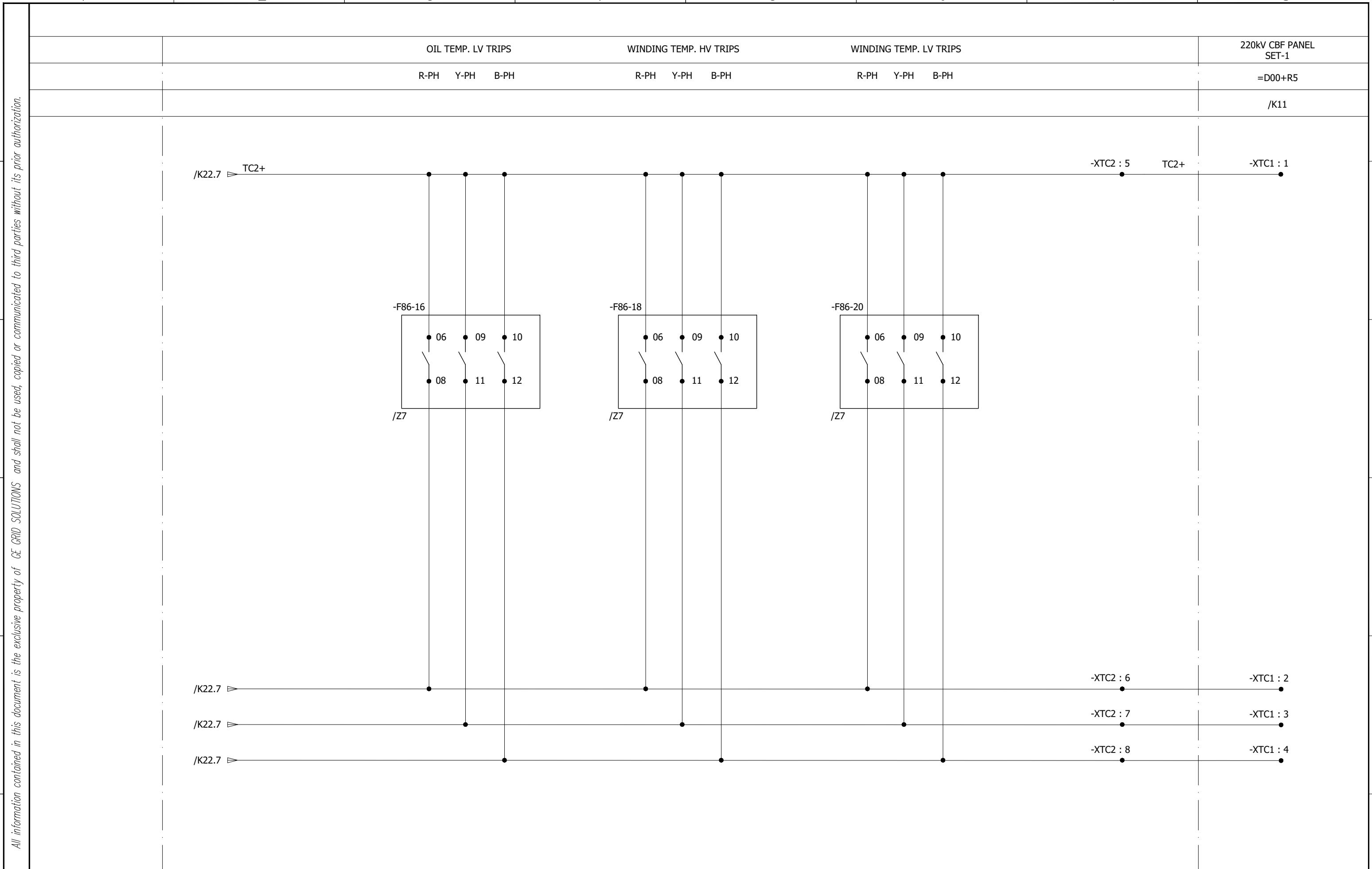
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR COIL - 2	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K22
									Sheet no. 25



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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR COIL - 2	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type K23	Sheet no. 26

1

2

3

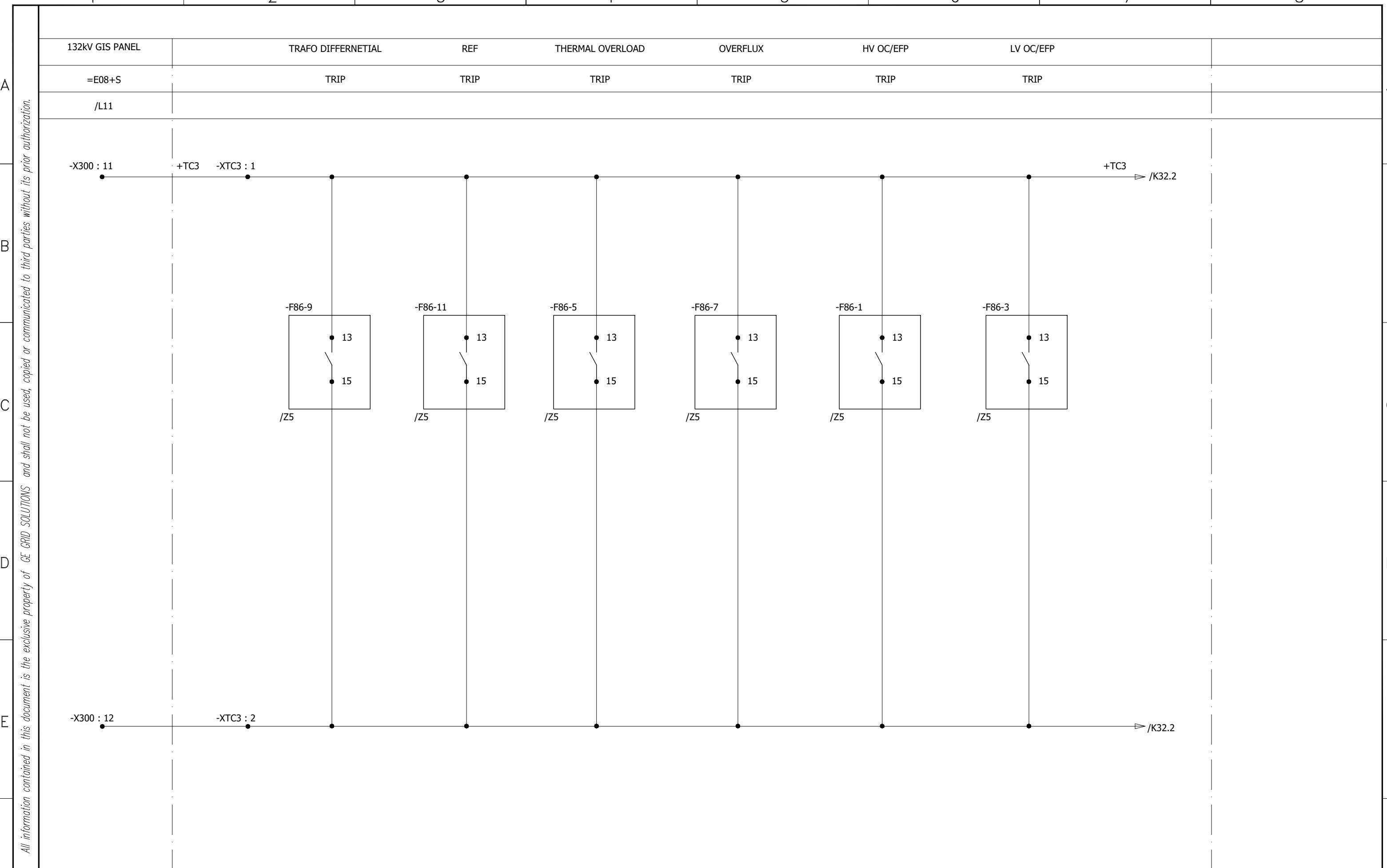
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR 132KV BREAKER COIL - 1	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type K31 Sheet no. 27
1	2	3	4	5	6	7	8		

OIL TEMP. HV

OIL TEMP. LV

WINDING TEMP. HV

WINDING TEMP. LV

220KV TRAFO RELAY PANEL
SET-2

TRIP

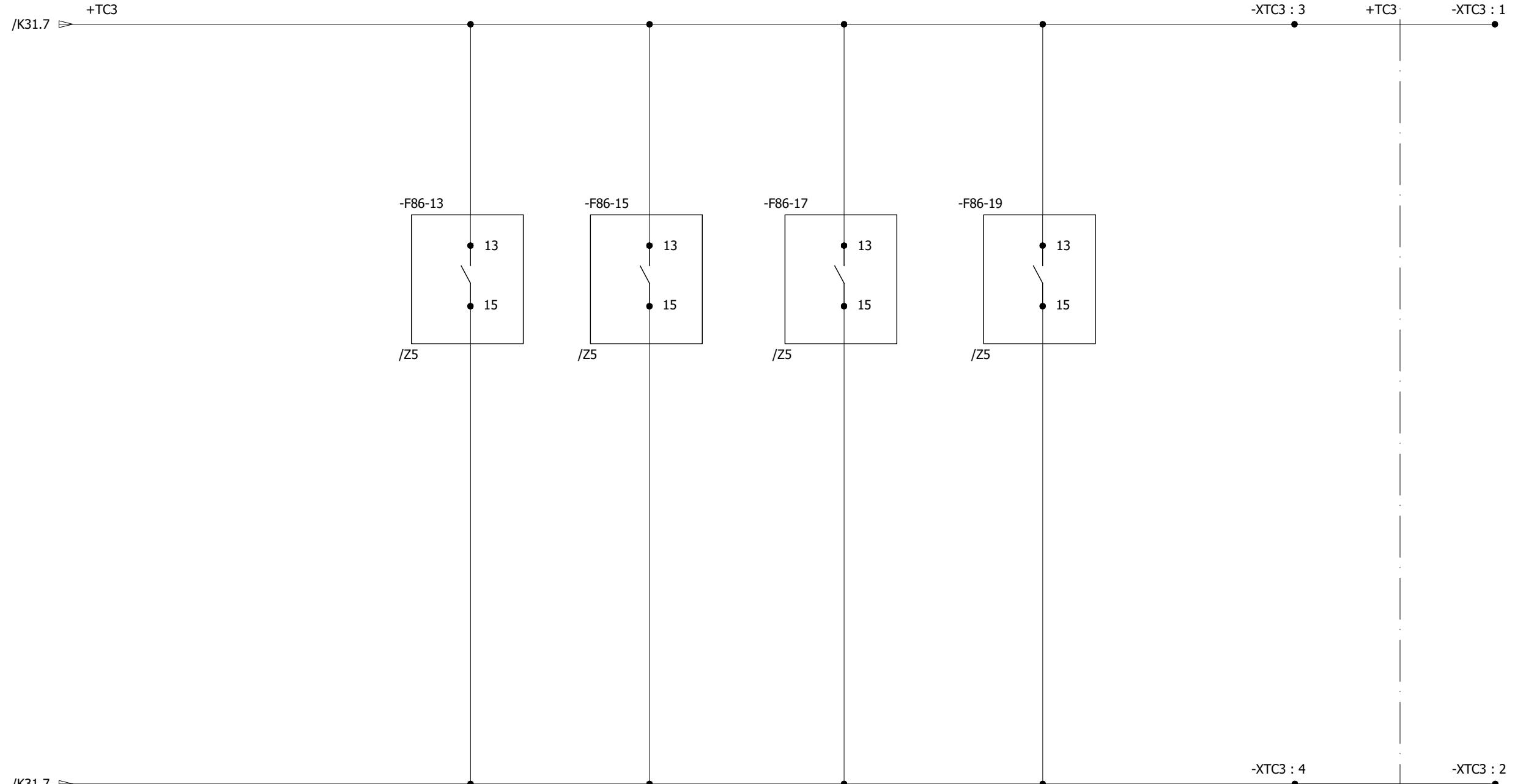
TRIP

TRIP

TRIP

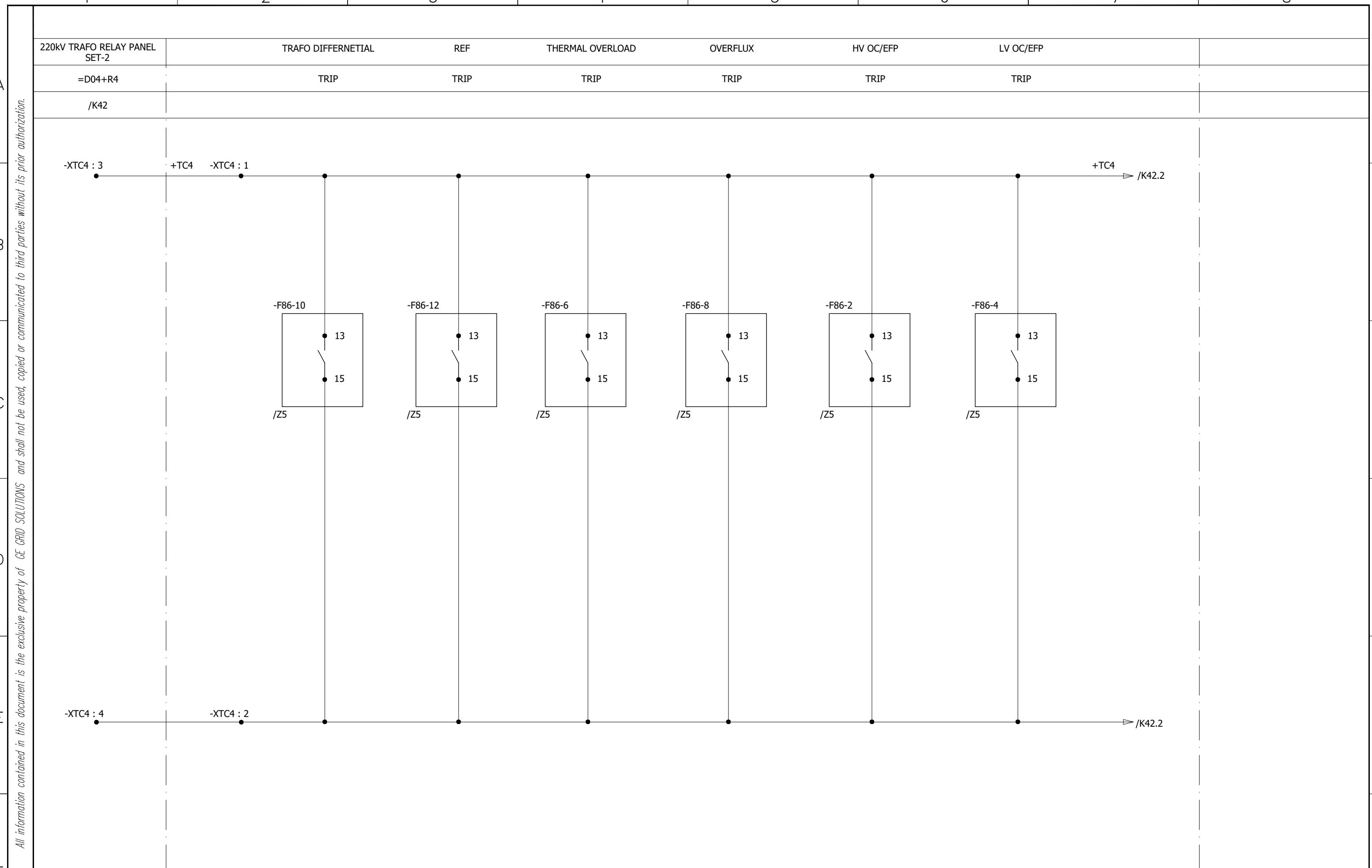
=D04+R4

/K31

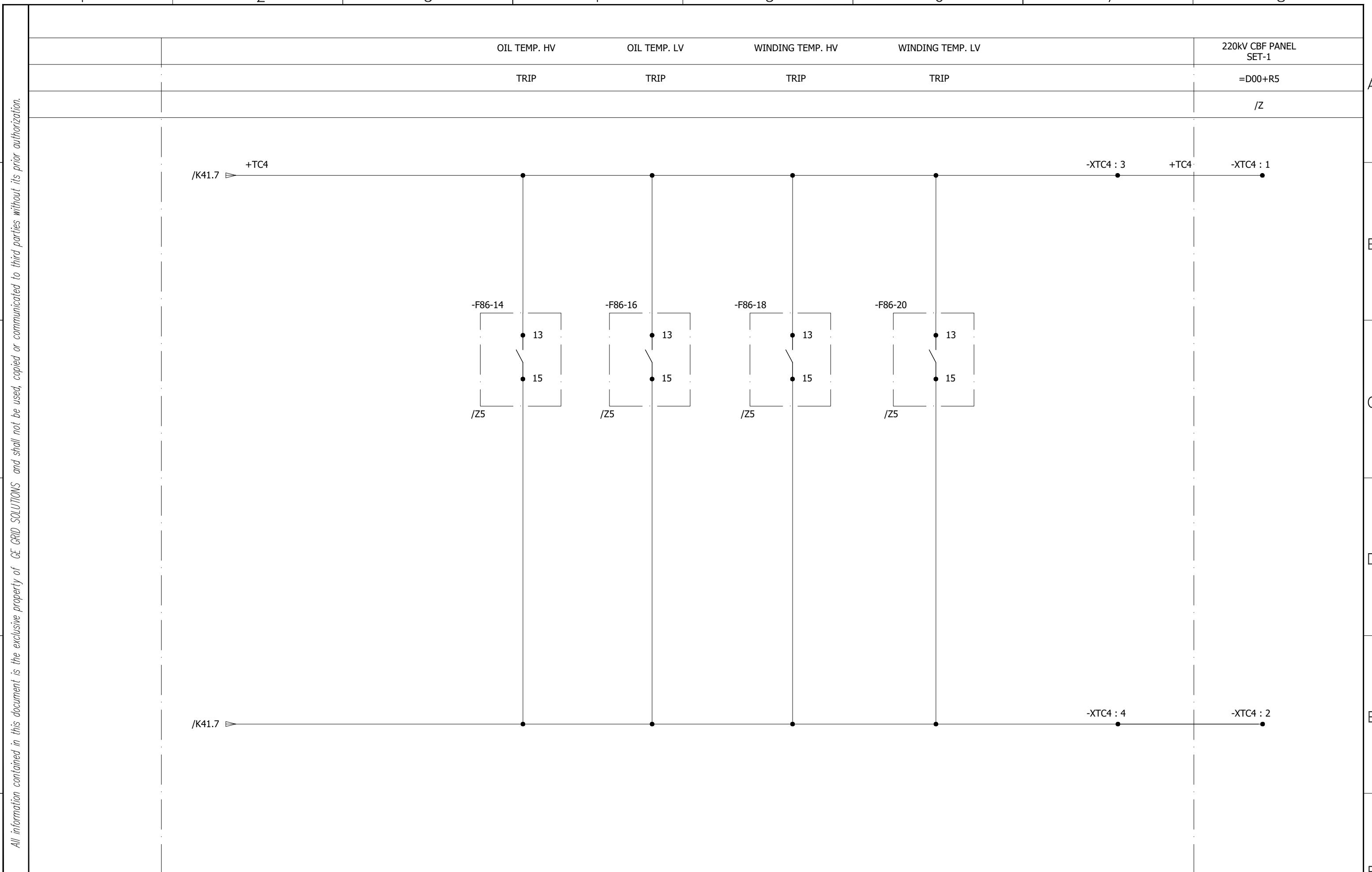


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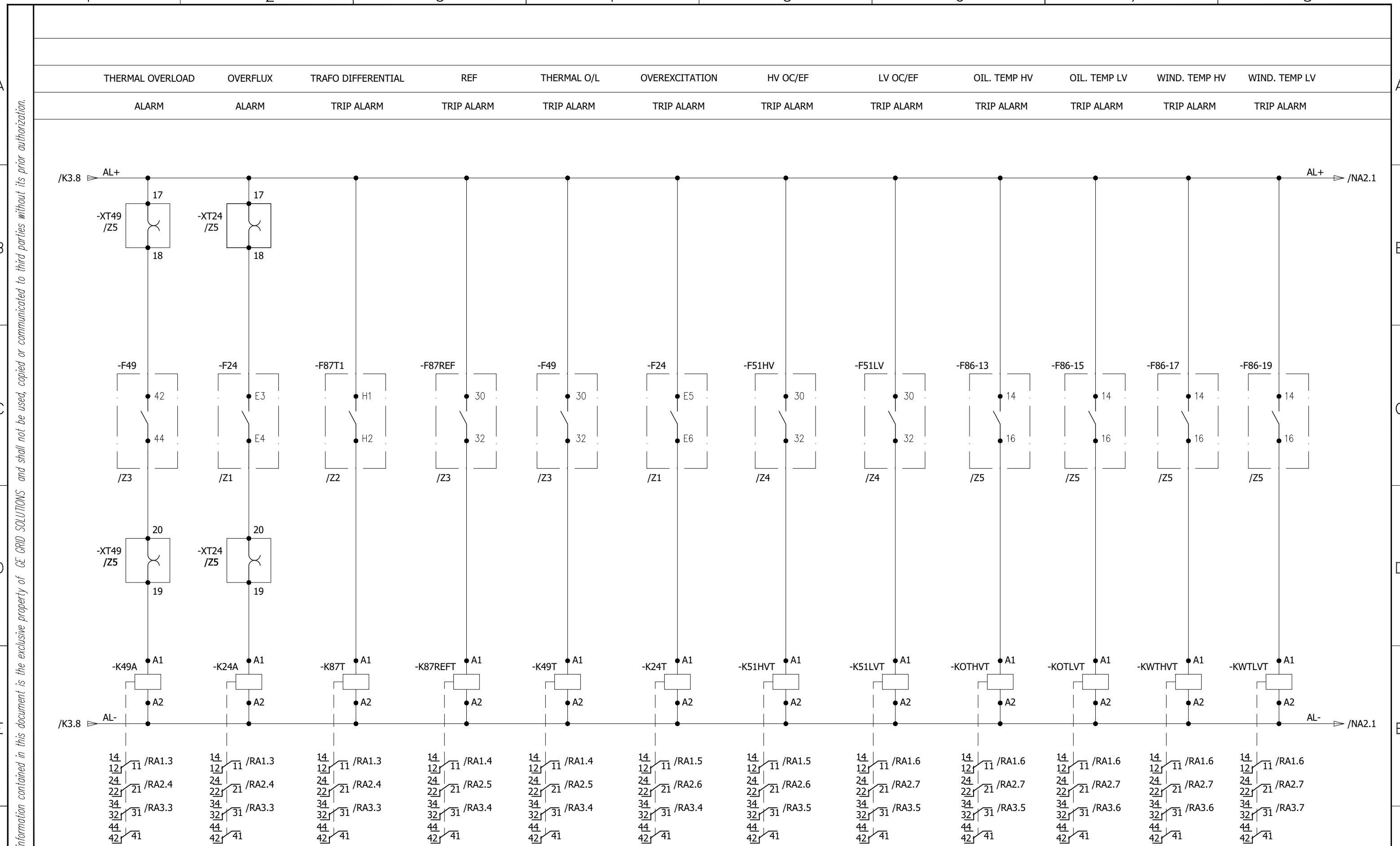
0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR 132KV BREAKER COIL - 1	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type K32 Sheet no. 28
1	2	3	4	5	6	7	8		



0	AS BUILT	22.11.2018	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 (=D09+R3) TRIP CIRCUIT FOR 132KV BREAKER COIL - 2	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K41
									Sheet no. 29



0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) TRIP CIRCUIT FOR 132kV BREAKER COIL - 2	Drawing no. P60194-E-DTR-SC-003		
									Project no. P-60194		
REV.	DESCRIPTION	DATE	DRAWER						Sheet type K42	Sheet no. 30	



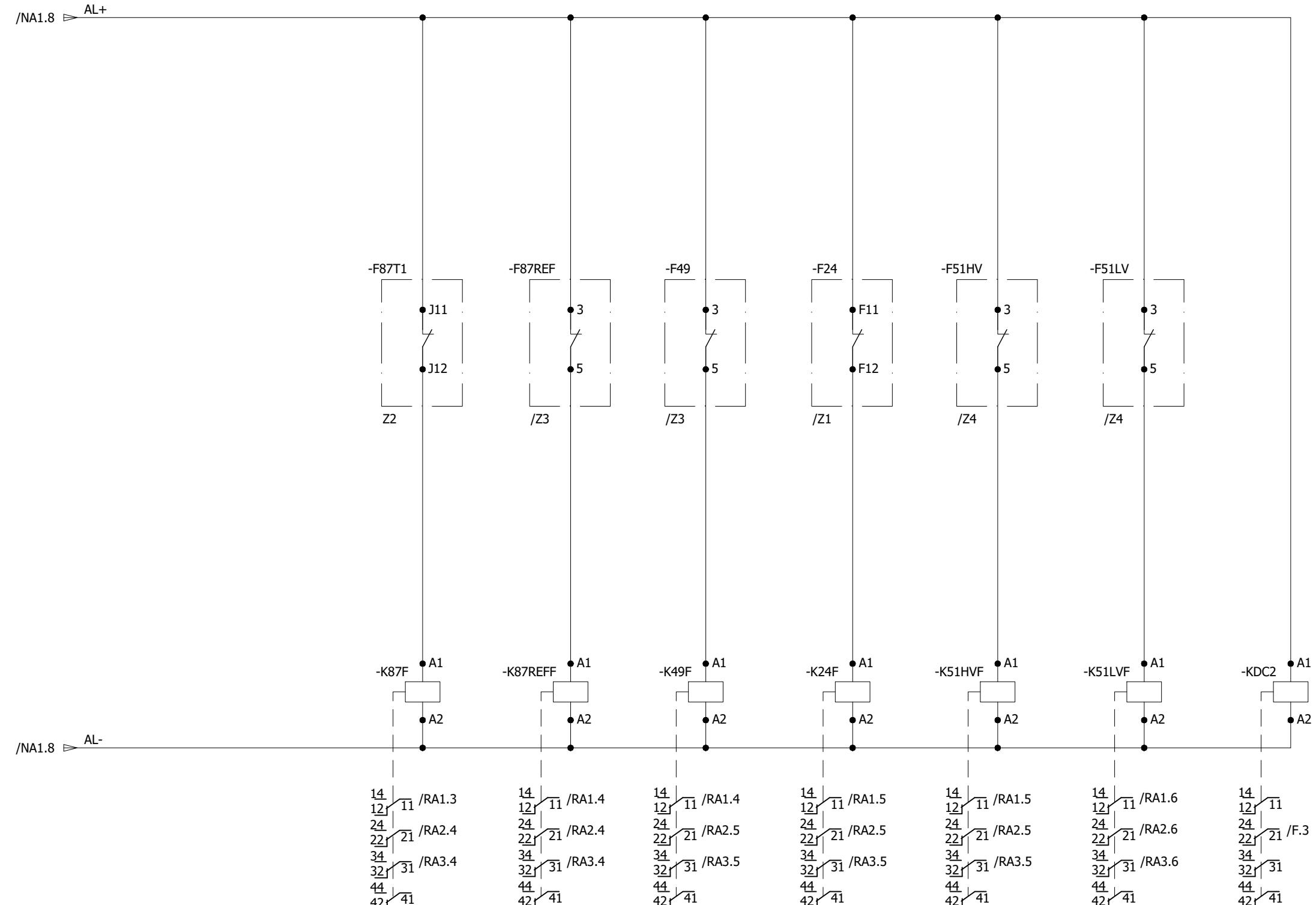
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type NA1

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TRAFO DIFFERENTIAL REF THERMAL O/L OVEREXCITATION HV OC/EF LV OC/EF DC SUPPLY

RELAY HEALTH RELAY HEALTH RELAY HEALTH RELAY HEALTH RELAY HEALTH RELAY HEALTH MONITORING



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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) SYSTEM ALARMS	Drawing no. P60194-E-DTR-SC-003	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type NA2	Sheet no. 32

1 2 3 4 5 6 7 8

RESET PUSHBUTTON
TRIP RELAYS

-S86

/G2.8 R2+ /O2.1

-S86
/Z1 1
2

/G2.8 /O2.1



/G2.8 R2- /O2.1 R2-

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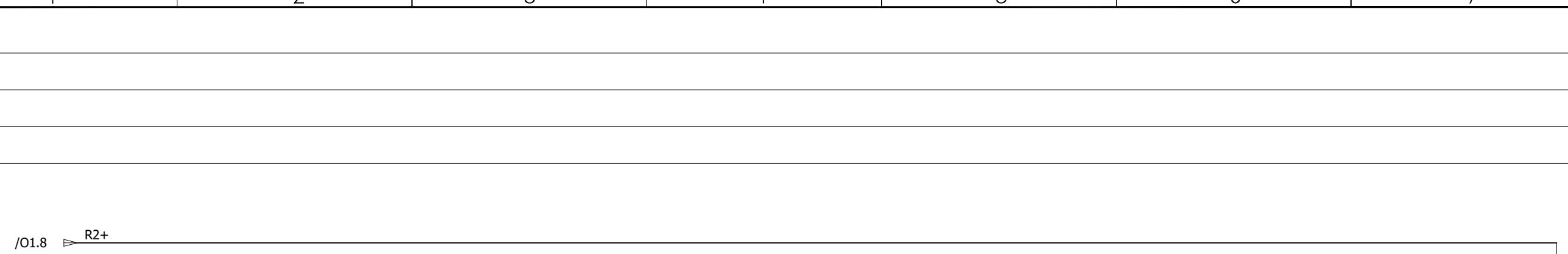
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REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type O1	Sheet no. 33

1 2 3 4 5 6 7 8

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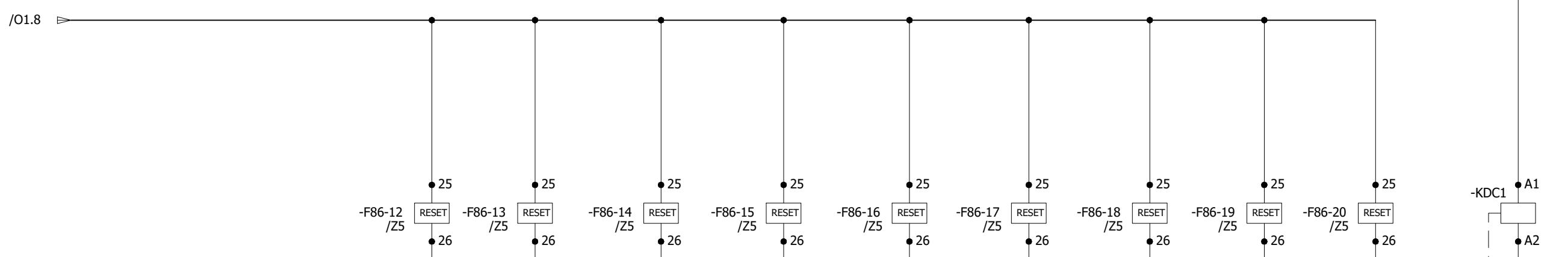
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22 21 /F.3
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) RESET CIRCUIT OF TRIPPING RELAYS	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type O2
									Sheet no. 34

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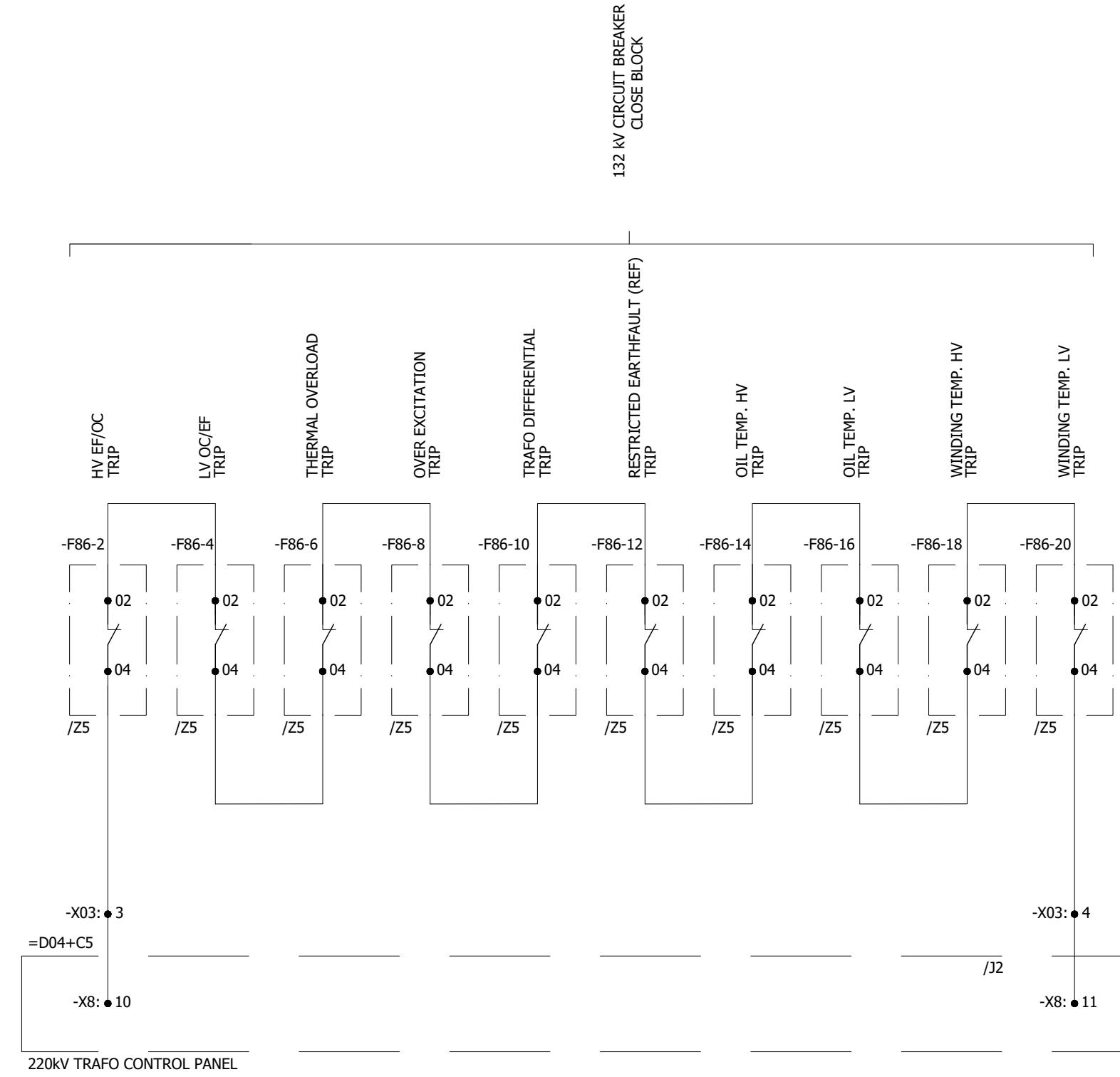
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION INTER-CIRCUITS	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type PA2	Sheet no. 36
1		2	3	4	5	6	7	8			

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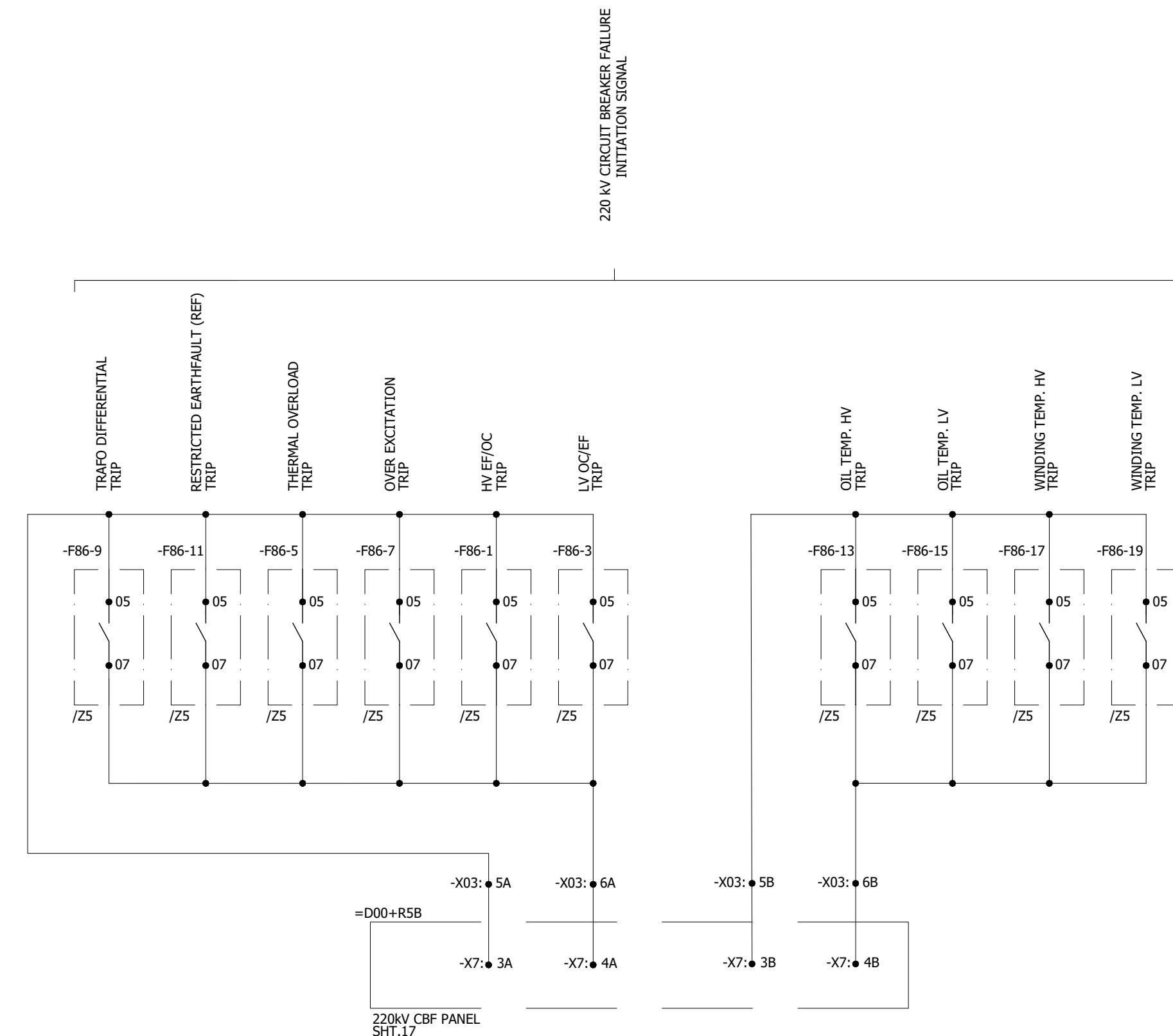
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0	AS BUILT		22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
REV.	DESCRIPTION		DATE	DRAWER	EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION INTER-CIRCUITS	P-60194	PA3	Sheet no. 37

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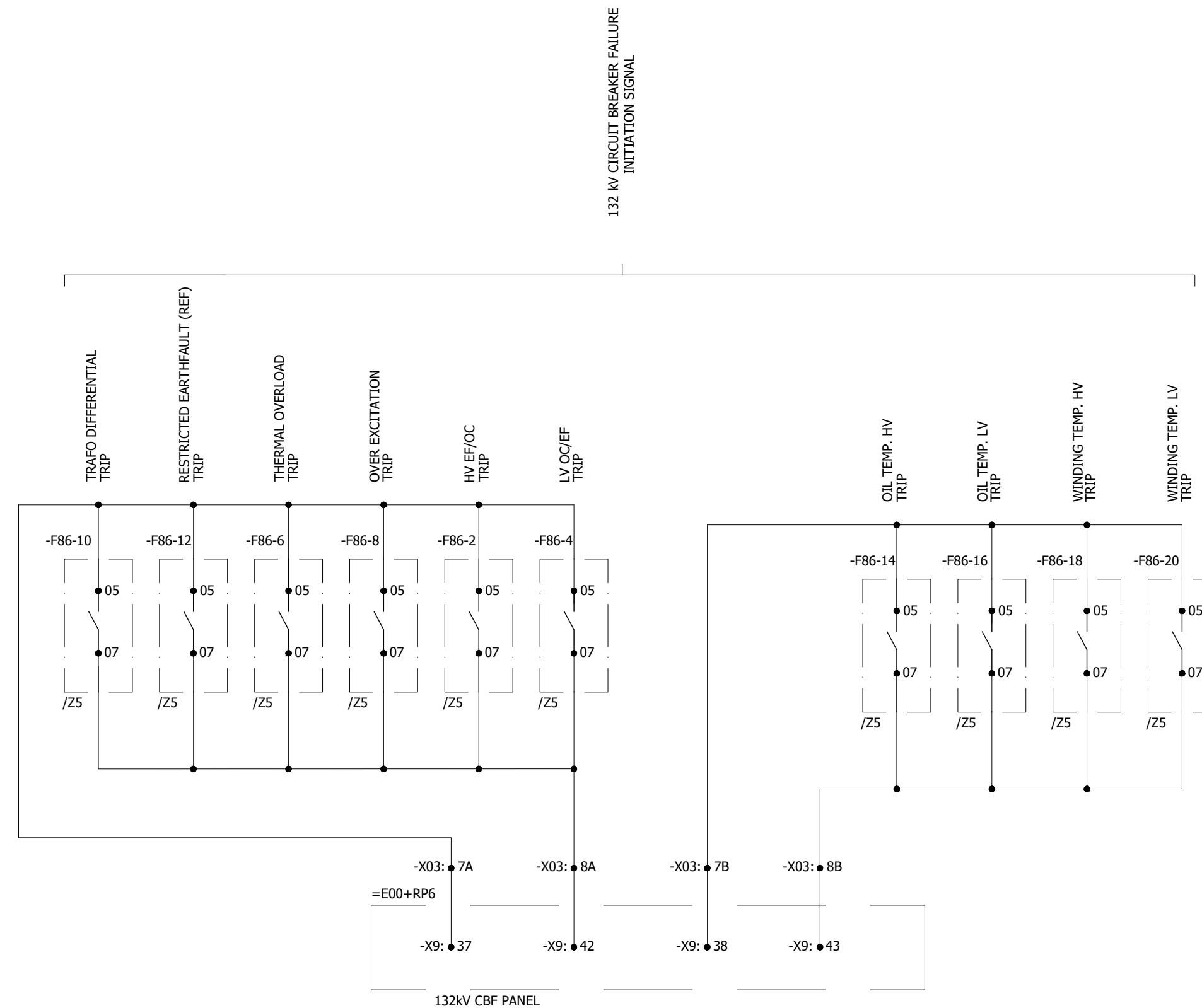
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0	AS BUILT	22.11.2018	ASJ	Manufacturer EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor GE Grid Solutions A GE and Alstom joint venture	Client NTDC-WAPDA NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION INTER-CIRCUITS	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type PA4
									Sheet no. 38

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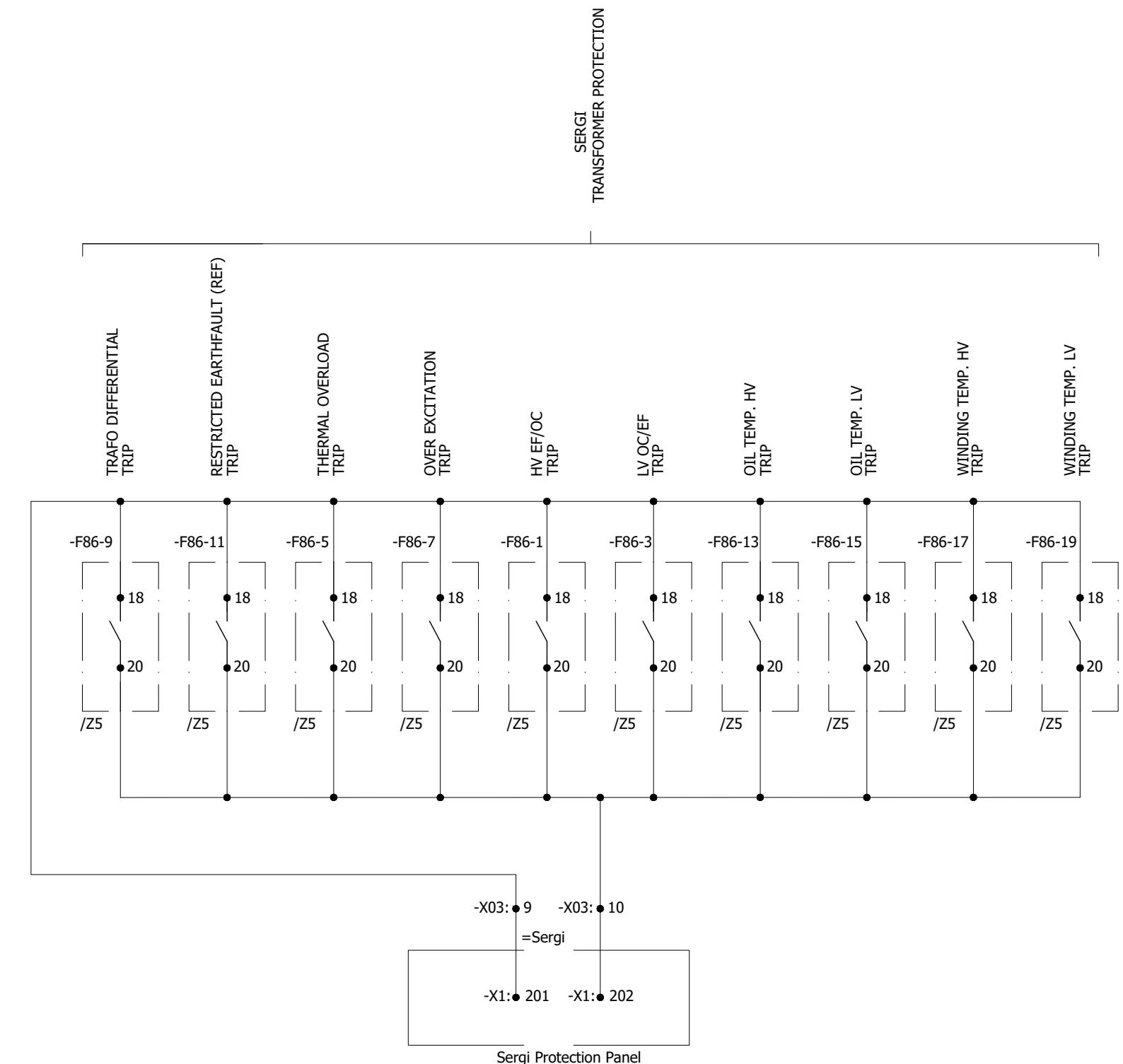
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0	AS BUILT		22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION INTER-CIRCUITS	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION		DATE	DRAWER						Project no. P-60194	Sheet type PA5	Sheet no. 39
1			2	3	4	5	6	7	8			

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A

THERMAL OVERLOAD ALARM

OVERFLUX ALARM

TRAFO DIFFERENTIAL TRIP

REF TRIP

THERMAL O/L TRIP

OVEREXCITATION TRIP

HV OC/EF TRIP

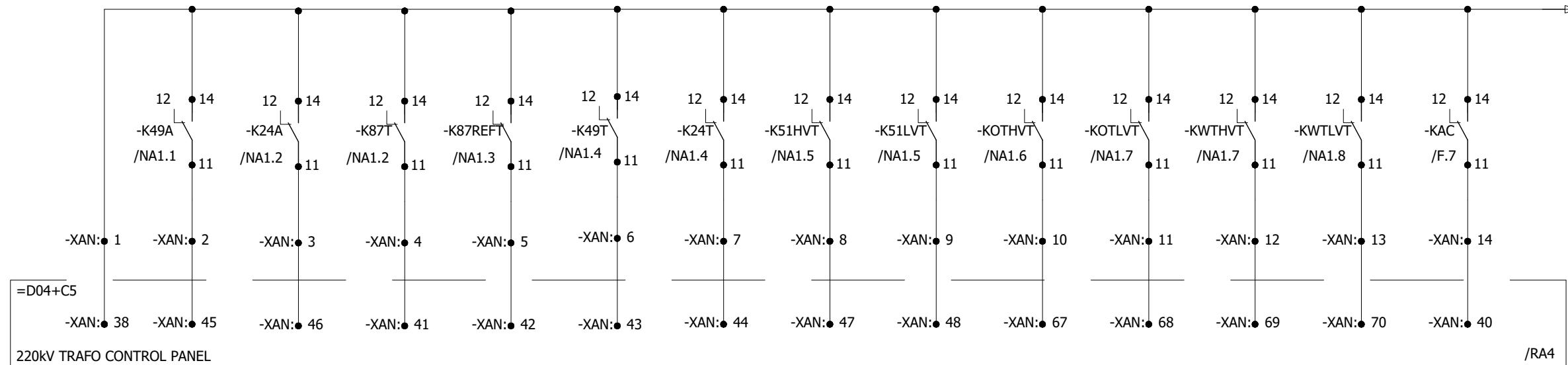
LV OC/EF TRIP

OIL TEMP HV TRIP ALARM

WIND TEMP LV TRIP ALARM

WIND TEMP LV TRIP ALARM

TRAFO RELAY SET-1 PANEL AC SUPPLY FAILURE



C

TRAFO DIFFERENTIAL RELAY UNHEALTHY

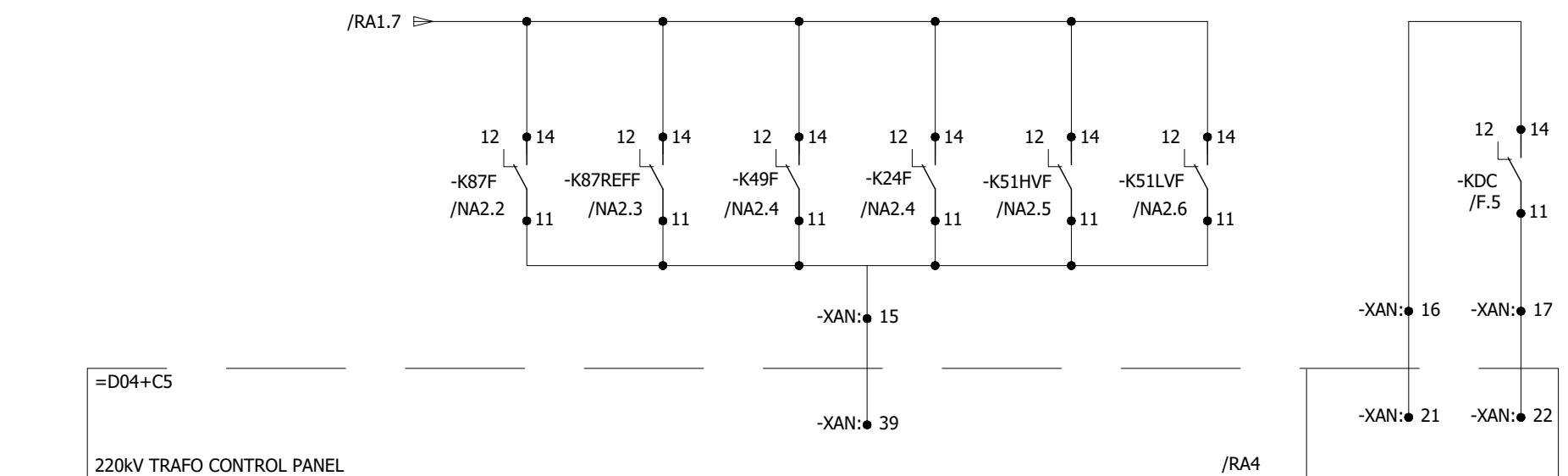
REF RELAY UNHEALTHY

THERMAL O/L RELAY UNHEALTHY

OVER EXCITATION RELAY UNHEALTHY

HV OC/EF RELAY UNHEALTHY

TRAFO RELAY SET-1 PANEL DC SUPPLY FAILURE



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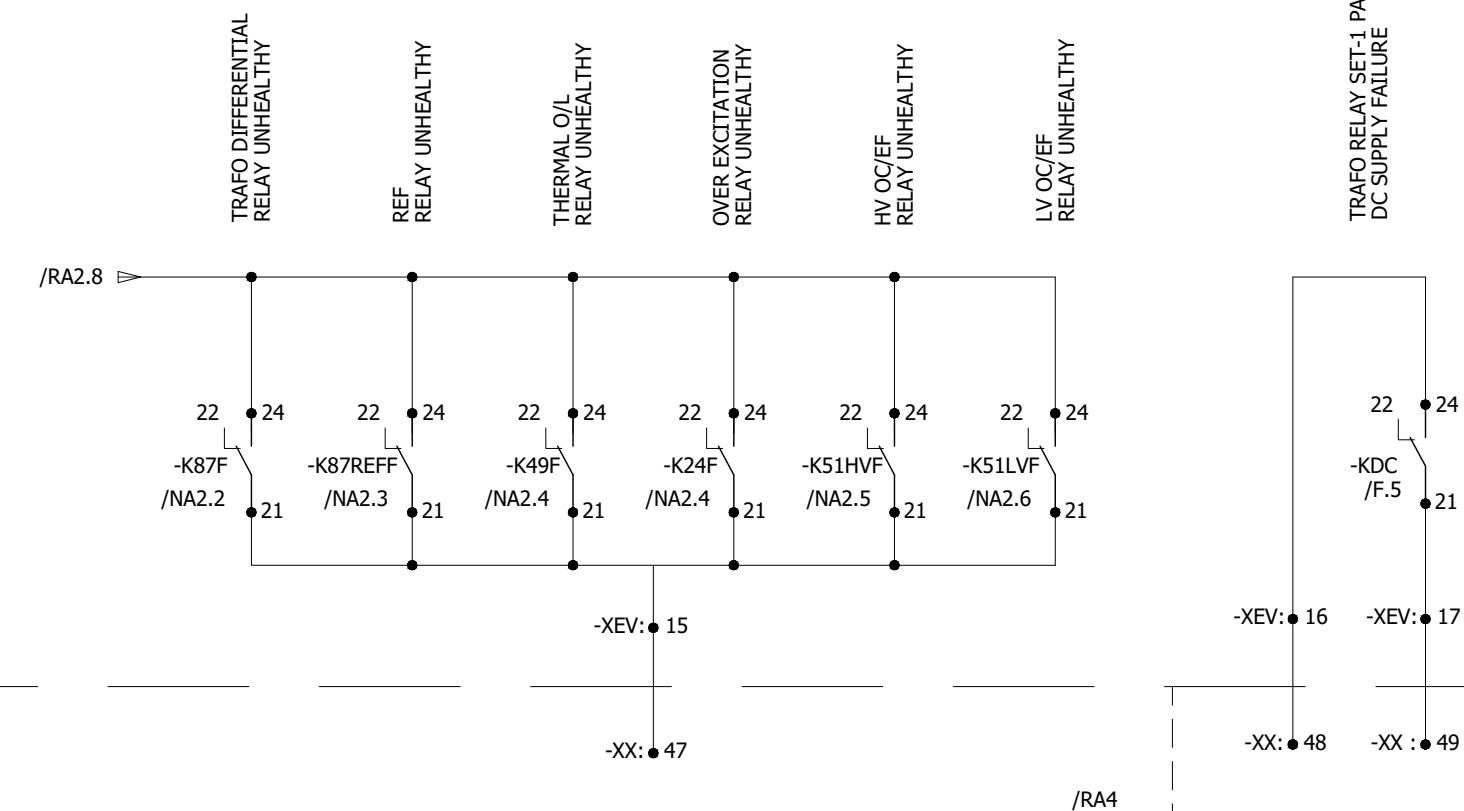
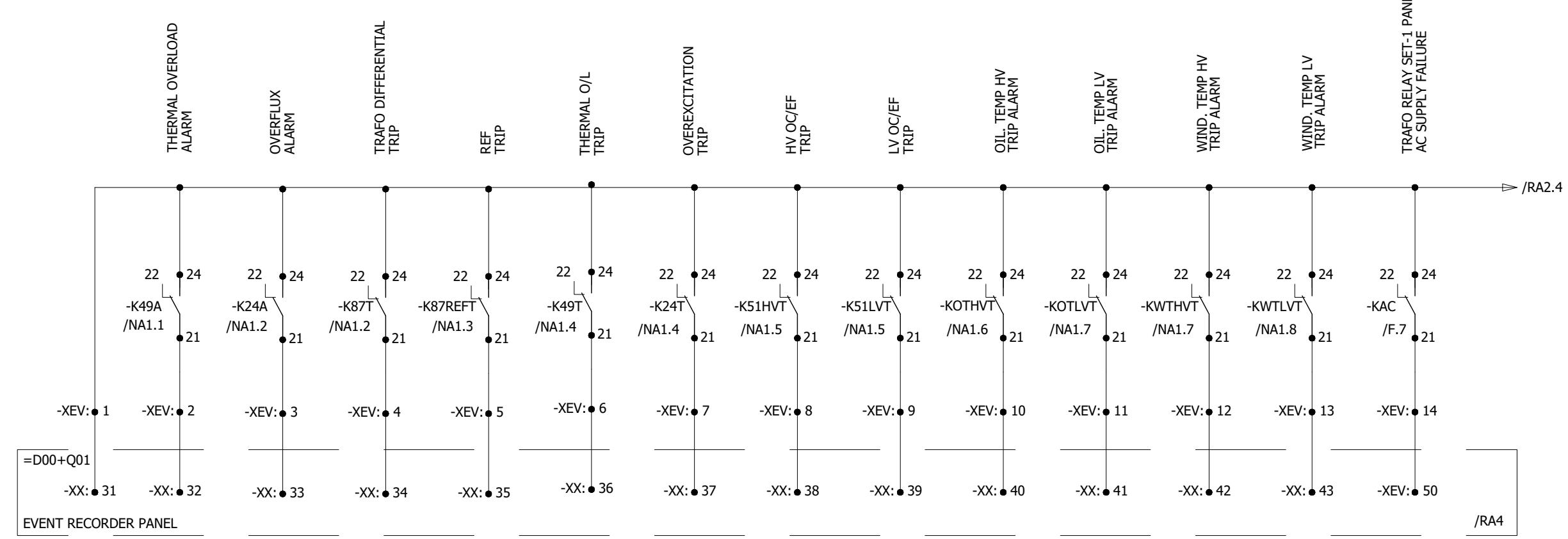
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) EVENT RECORDER CIRCUITS	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA2	Sheet no. 41
1	2	3	4	5	6	7	8				

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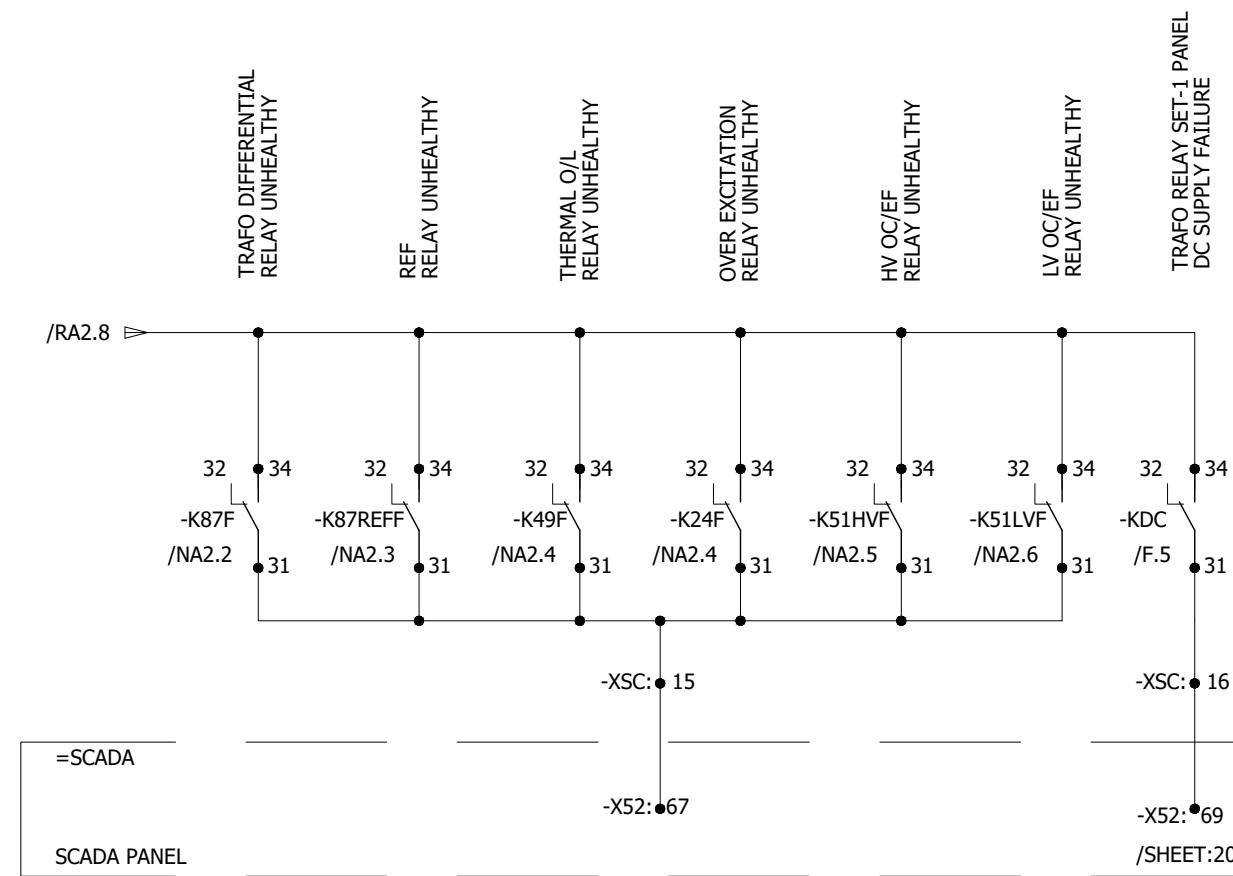
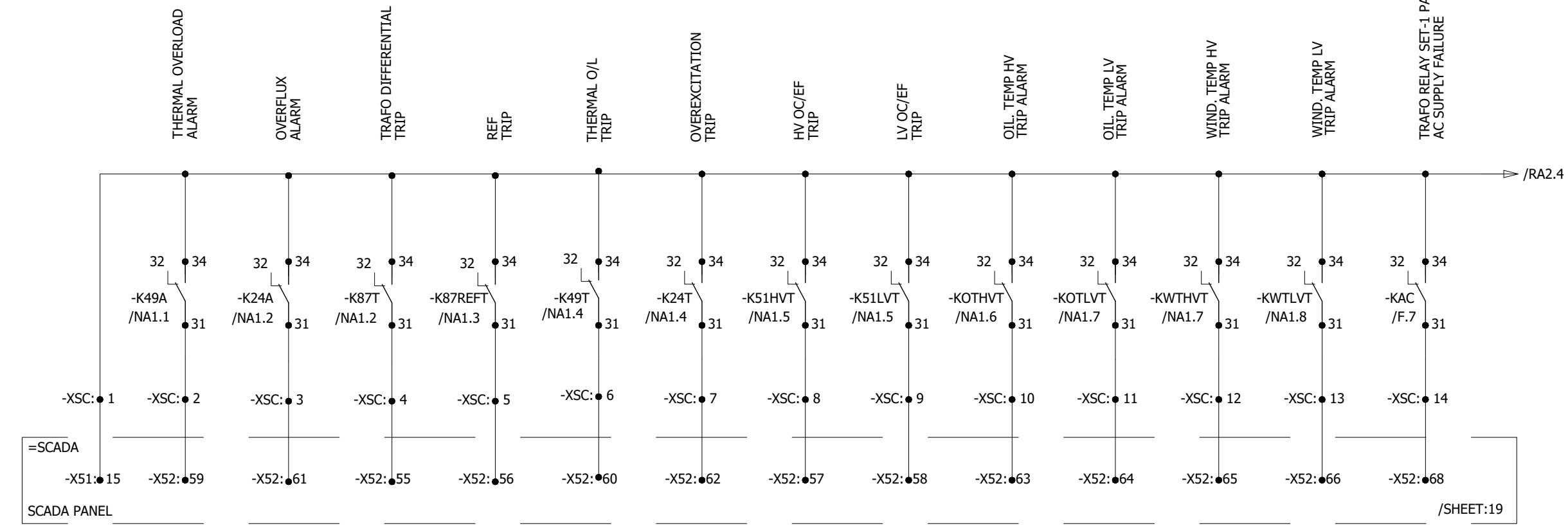
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV TRAFO RELAY SET-1 PANEL (=D09+R3) SCADA CIRCUIT	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA3	Sheet no. 42
1	2	3	4	5	6	7	8				

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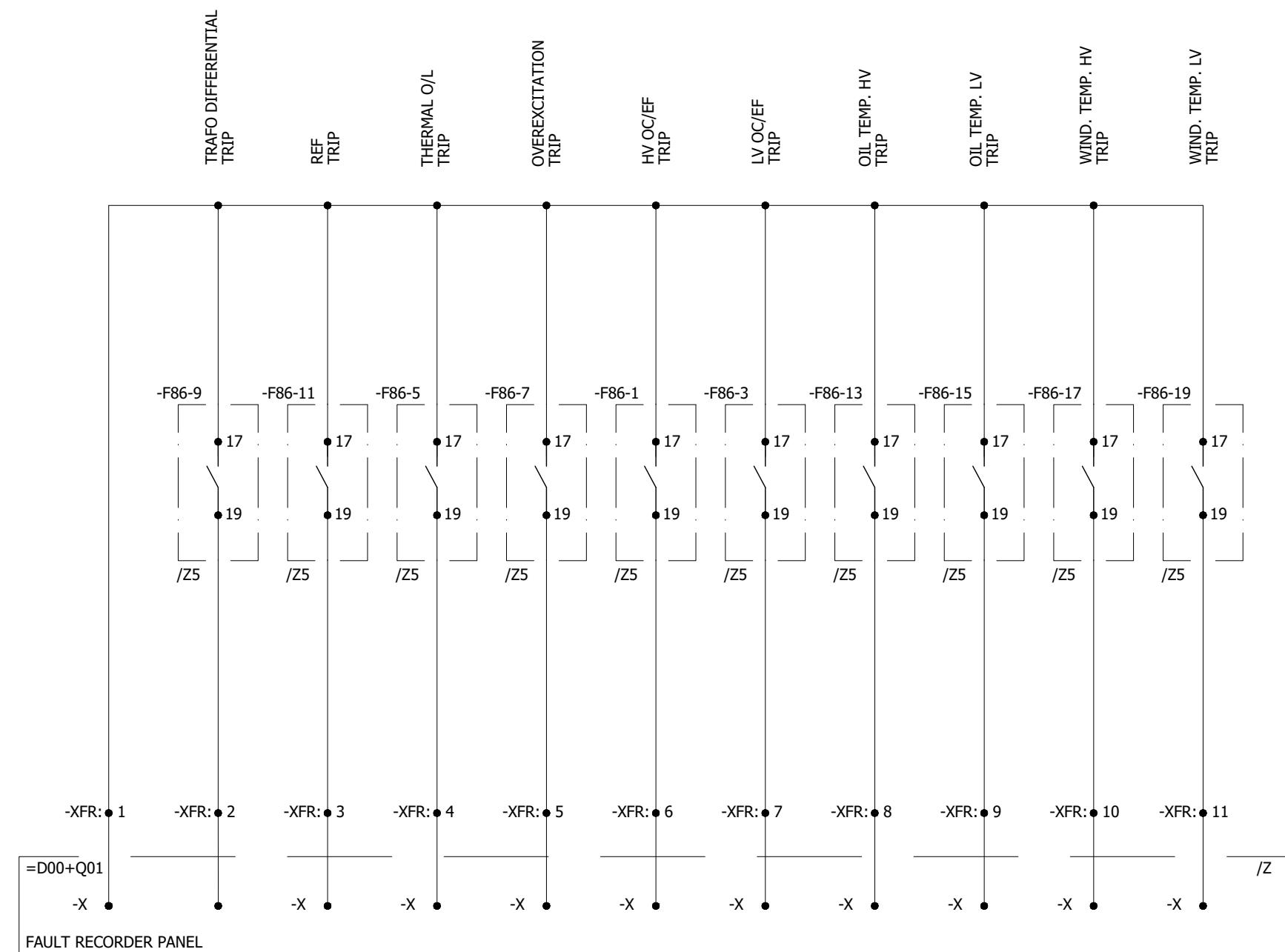
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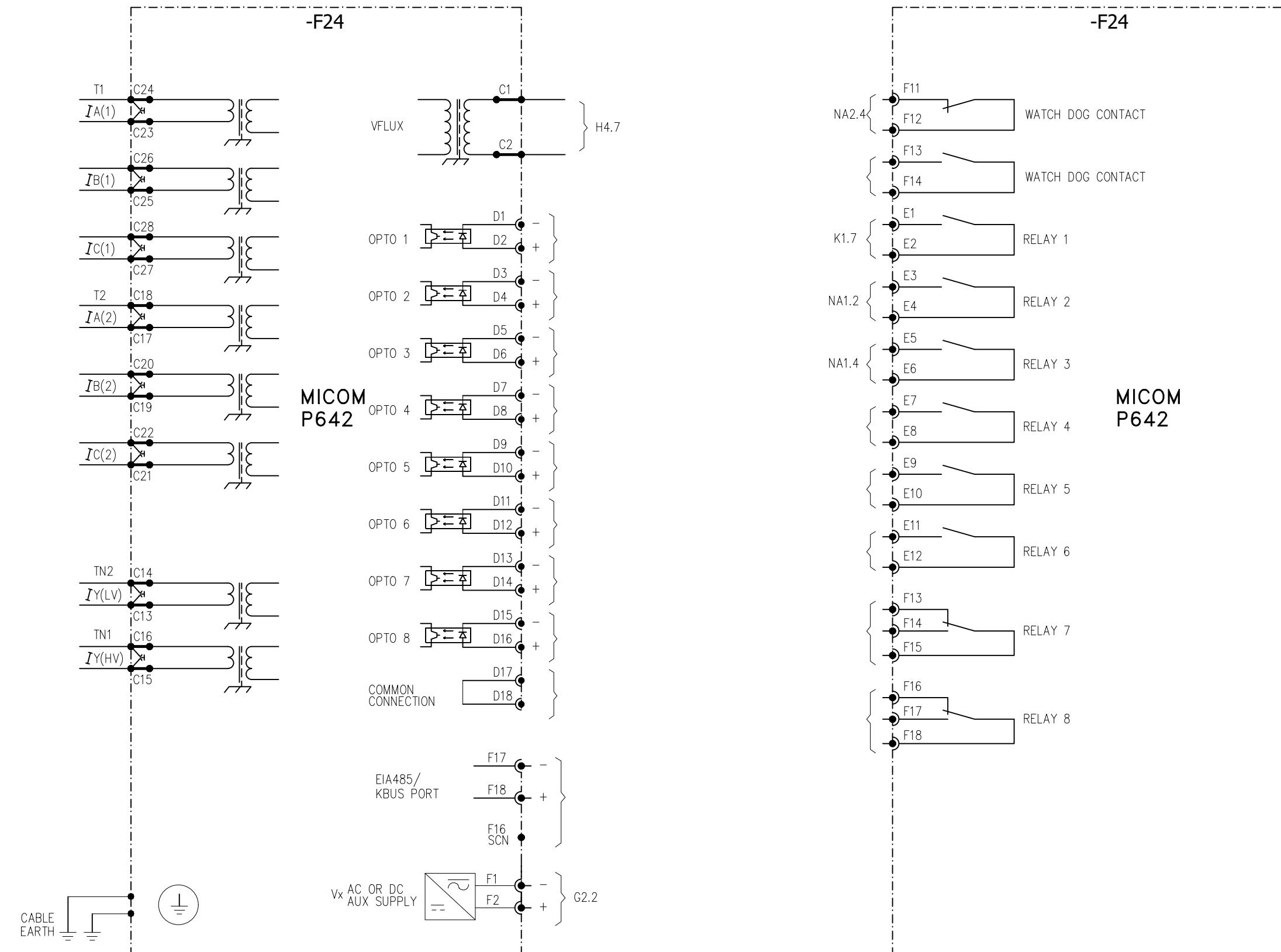
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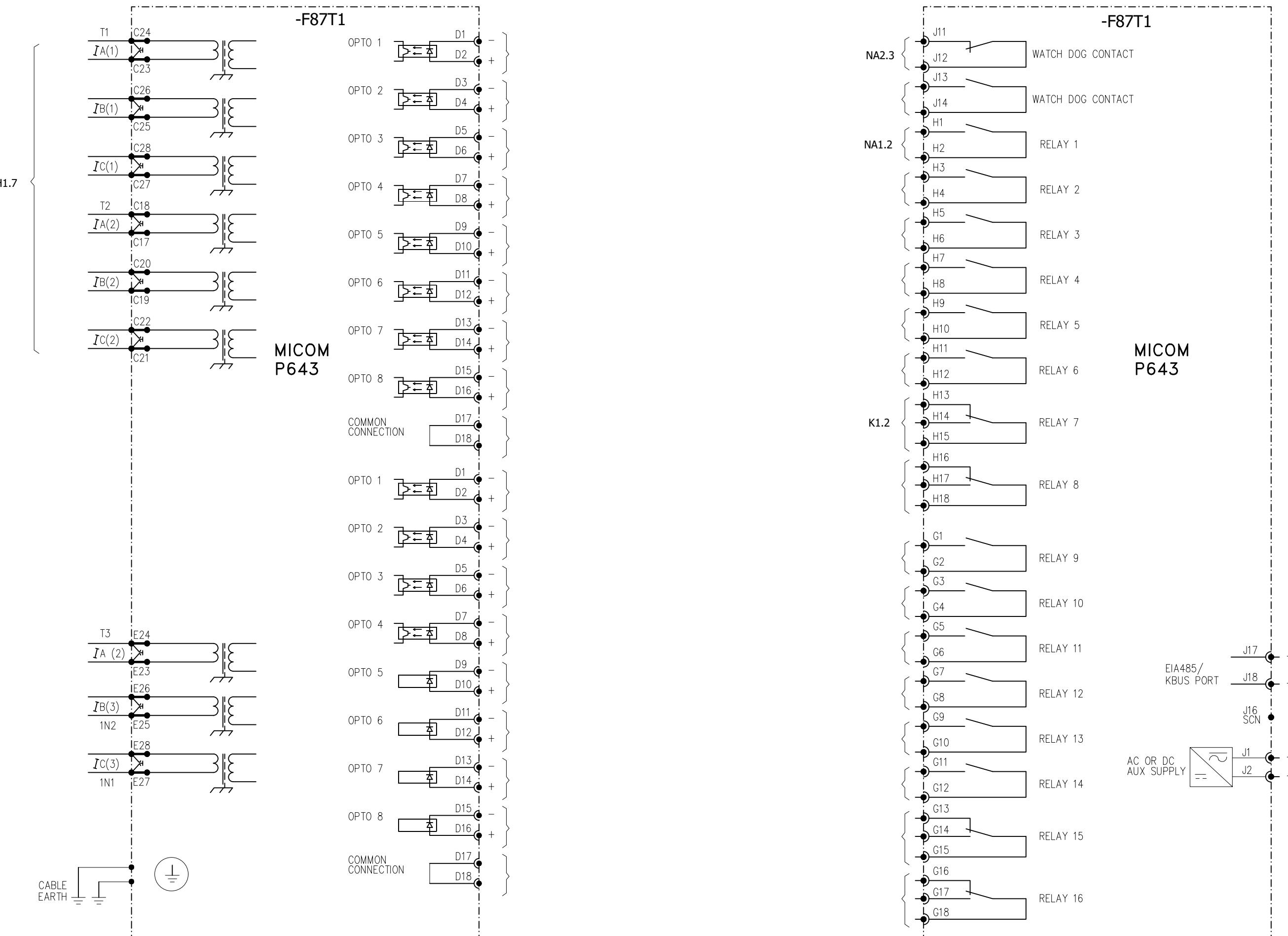
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type RA4
									Sheet no. 43

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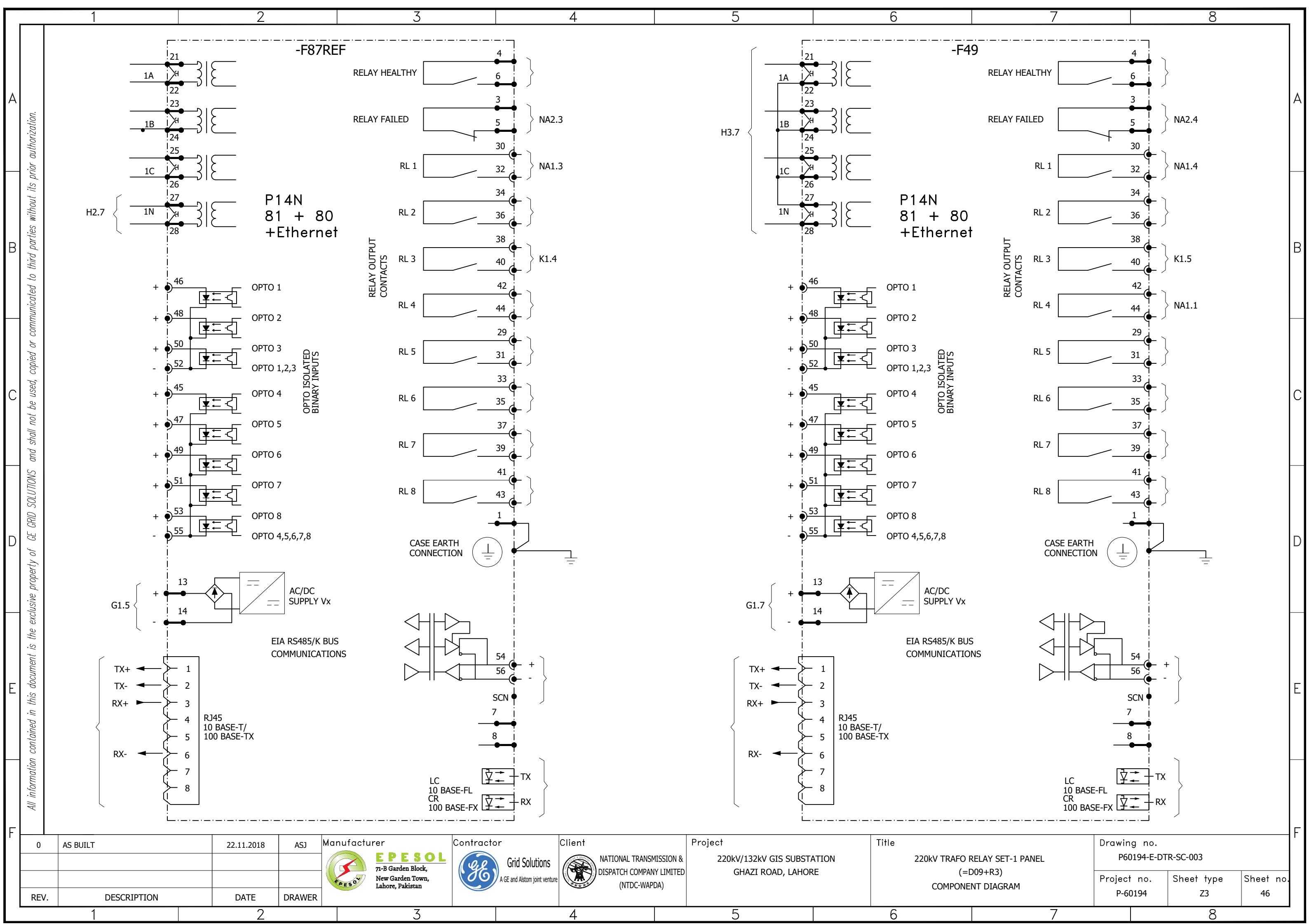
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z1	Sheet no. 44
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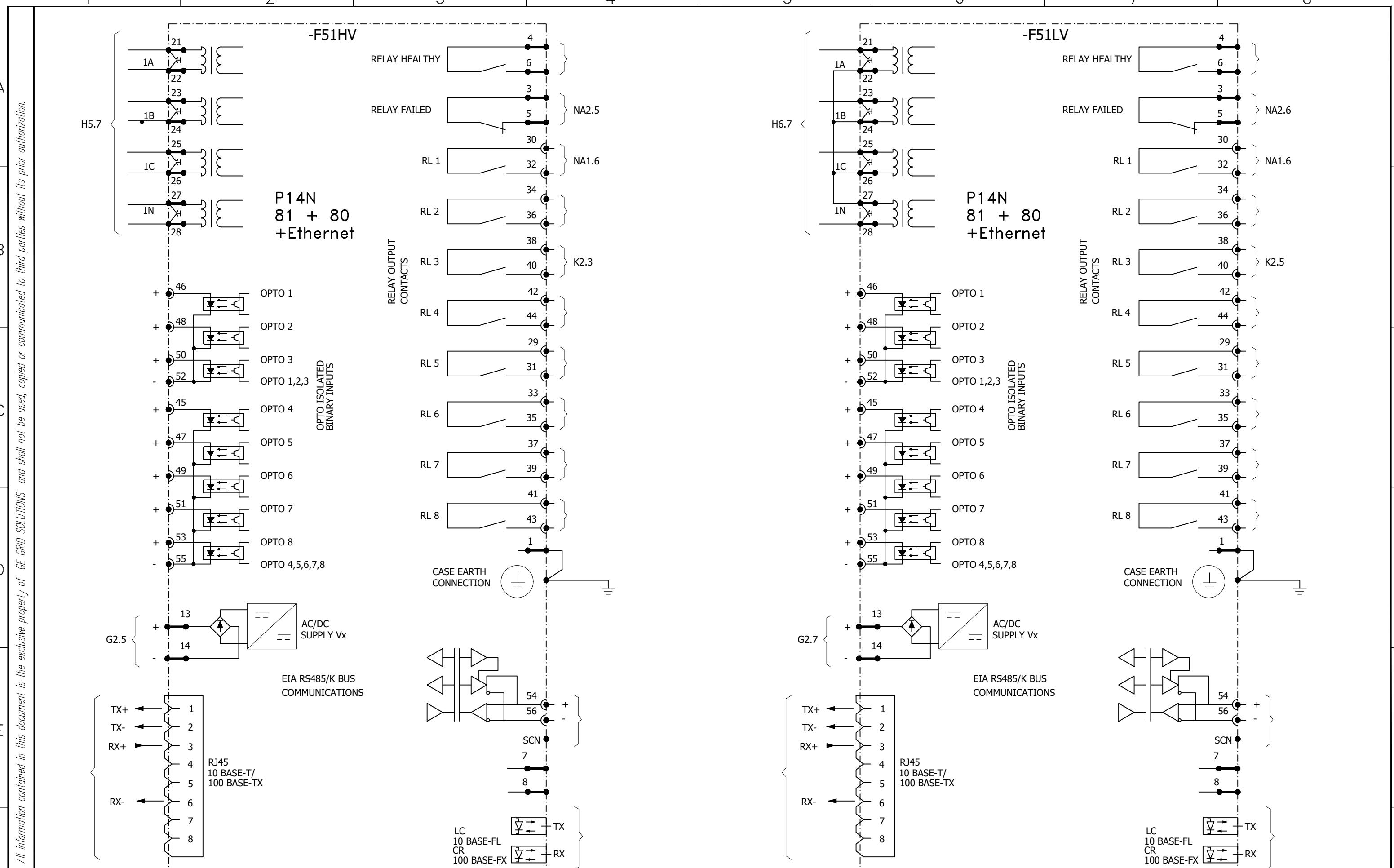
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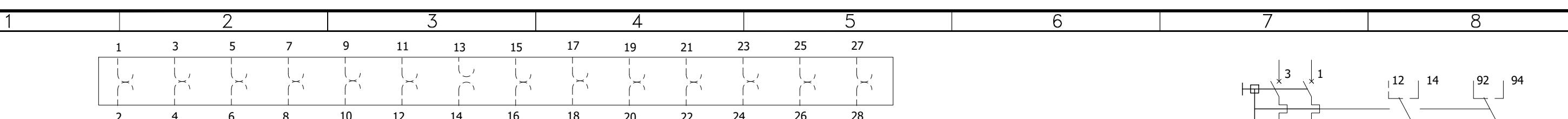
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
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									Sheet no. 45

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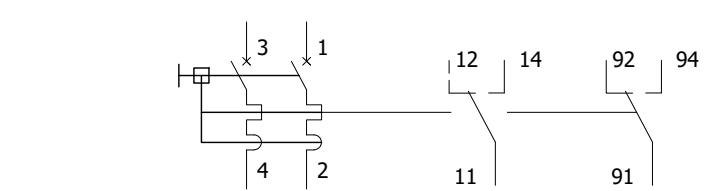




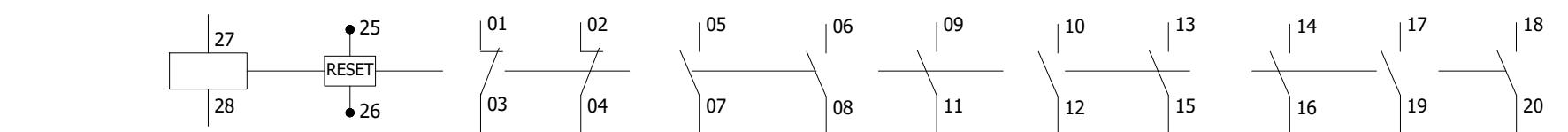
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type Z4
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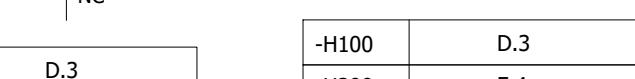
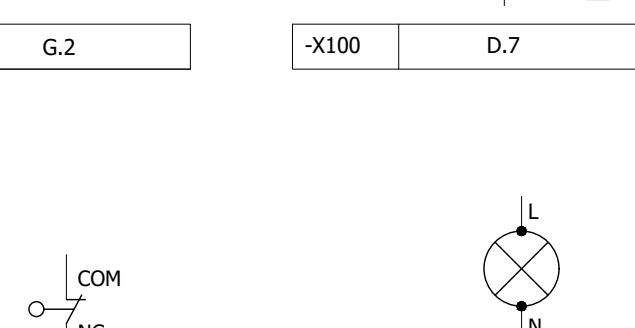
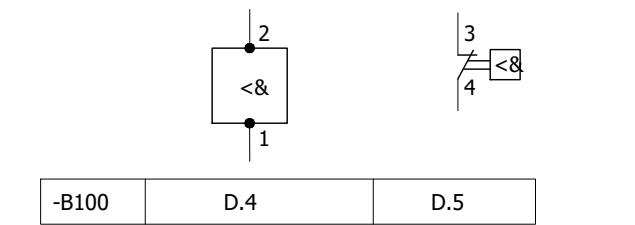
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-XT87REF		K1.4	G1.5			H2.5							
-XT49	H3.5	K1.6	G1.7		NA1.1		H3.5						
-XT24	H4.5	K1.7	G2.2		NA1.2								
-XT51HV	H5.5	K2.3	G2.5				H5.5						
-XT51LV	H6.5	K2.5	G2.7				H6.5						



-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	



-F86-9	K1.2	O1.2	PA1.3		PA3.3	K11	K11	K11	K31		RA4.3	PA5.3	
-F86-10	K1.3	O1.2		PA2.3	PA4.3	K21	K21	K21	K41				
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-F86-12	K1.4	O1.3		PA2.3	PA4.3	K21	K21	K21	K41				
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-F86-6	K1.6	O1.4		PA2.4	PA4.4	K21	K21	K21	K41				
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-F86-8	K1.7	O1.5		PA2.4	PA4.4	K21	K21	K21	K41				
-F86-1	K2.3	O1.6	PA1.4		PA3.4	K12	K12	K12	K31		RA4.4	PA5.4	
-F86-2	K2.3	O1.6		PA2.4	PA4.4	K22	K22	K22	K41				
-F86-3	K2.4	O1.7	PA1.5		PA3.5	K12	K12	K12	K31		RA4.5	PA5.5	
-F86-4	K2.5	O2.2		PA2.5	PA4.5	K22	K22	K22	K41				
-F86-13	K3.2	O2.2	PA1.5		PA3.5	K12	K12	K12	K32	NA1.6	RA4.5	PA5.5	
-F86-14	K3.3	O2.3		PA2.5	PA4.5	K22	K22	K22	K42				
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-F86-16	K3.4	O2.4		PA2.5	PA4.5	K23	K23	K23	K42				
-F86-17	K3.5	O2.4	PA1.6		PA3.6	K13	K13	K13	K32	NA1.7	RA4.6	PA5.6	
-F86-18	K3.6	O2.5		PA2.6	PA4.6	K23	K23	K23	K42				
-F86-19	K3.7	O2.5	PA1.6		PA3.6	K13	K13	K13	K32	NA1.8	RA4.6	PA5.6	
-F86-20	K3.8	O2.6		PA2.6	PA4.6	K23	K23	K23	K42				



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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) COMPONENT DIAGRAM	Drawing no. P60194-E-DTR-SC-003	Project no. P-60194	Sheet type Z5	Sheet no. 48
REV.	DESCRIPTION	DATE	DRAWER									
1	2	3	4	5	6	7	8					