



Grid Solutions
A GE and Alstom joint venture

220kV/132kV GIS SUBSTATION GHAZI ROAD , LAHORE

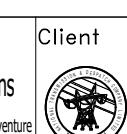
220kV TRANSFORMER RELAY SET-1 PANEL (=D09+R3) SCHEMATIC DRAWINGS

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							
			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 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						

	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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0	AS BUILT	22.11.2018	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 TRAFO RELAY SET-1 PANEL (=D09+R3) SYMBOLA AND LEGENDS	Drawing no. P60194-E-DTR-SC-003
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	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,-K87REFT,-K49T -K24T,-K51HVT,-K51LVT,-KOTHVT,-KOTLVT,-KWTHVT,KWTLVT -K87F,-K87REFF,-K49F,-K24F,-K51HVF,-K51LVF		GE		
G	02	AUXILIARY CONTACTOR		PRC4M40ANL, Coil Voltage: 230VAC, 4 C/O Contacts			-KACM, -KDC		GE		
	01	INDICATION LAMP - DC SUPPLY FAILURE		YS-PL-2-AL-22-R-W, Type: Integrated LED , Color : RED , Supply : 230VAC @ 50Hz			-H200		YOUNGSUNG		
H	01	PANEL LIGHT WITH DOOR SWITCH		YST8-30-5W+YSP3315GWB, 230VAC @ 50Hz, 20W, with Door Limit Sw. 1 CO contact			-H100, -S100		YOUNGSUNG		
	01	THREE PIN SOCKET		1N+PE, 16A, 230VAC @ 50Hz			-X100		LEAR		
I	01	PANEL HEATER		230VAC @ 50Hz, 50W			-R100		E-LABS		
	01	HUMIDITY & TEMPERATURE CONTROLLER		THERMOSTAT AND HUMIDSTAT			-B100		E-LABS		
J	01	RESISTOR		ZB9016774, (1500 Ohm)			-RS1		-		
	01	METROSIL		600A/S1/S1088			-M1		METROSIL		
K	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-X4		CABUR		
	08	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-X5		CABUR		
	03	TERMINAL BLOCKS FOR CT WITH SHORTING ARRANGEMNT		Type: SCB-6			-X6		CABUR		
	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 GHAZI 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

	1	2	3	4	5	6	7	8		
A B C D E F	QTY.	DEVICE DESCRIPTION		DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION		MANUFACTURER	
	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	
	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	
	02	TERMINAL BLOCKS FOR AC FAULTY CIRCUIT		Type: CBD-4			-X12		CABUR	
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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) COMPONENT LIST	Drawing no. P60194-E-DTR-SC-003
									Project no. P-60194	Sheet type AC1
REV.	DESCRIPTION		DATE	DRAWER						

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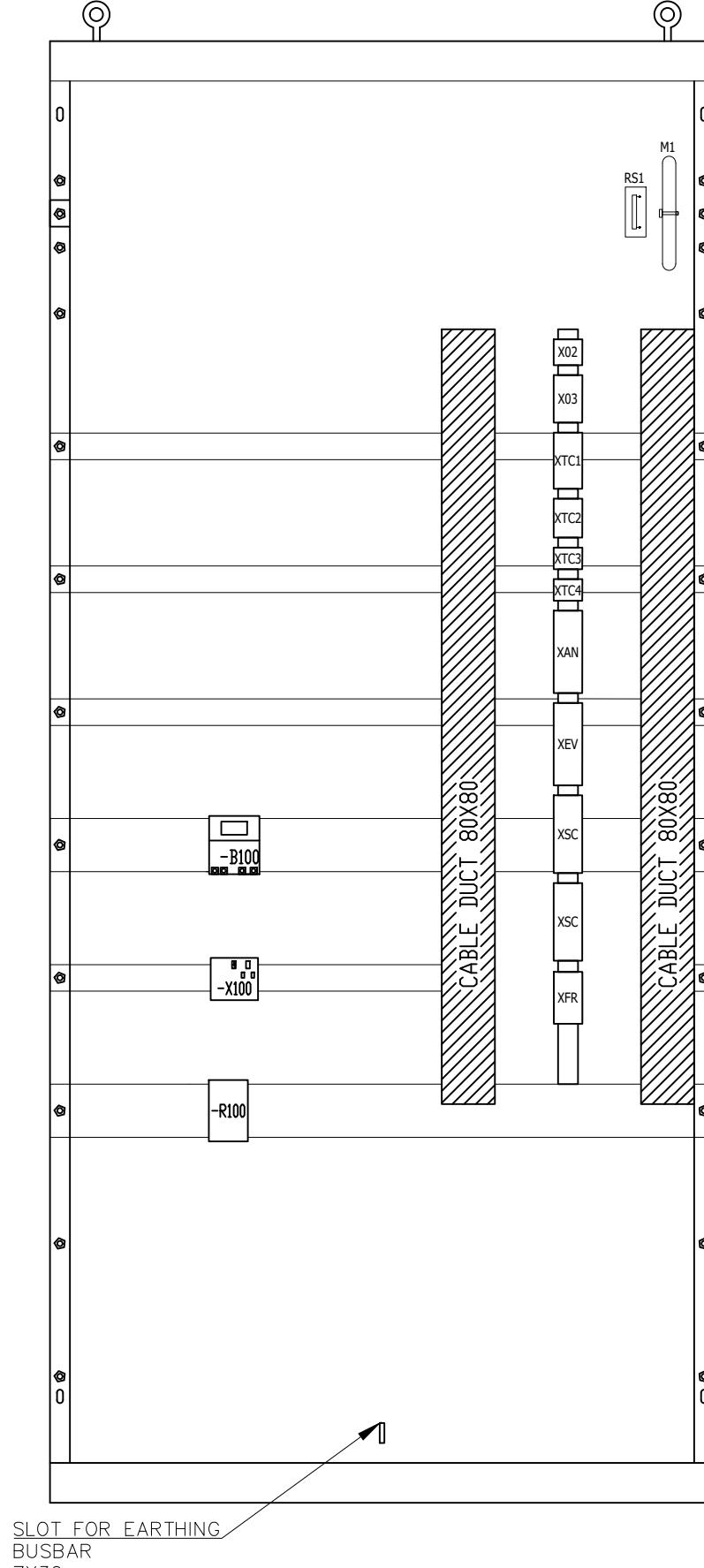
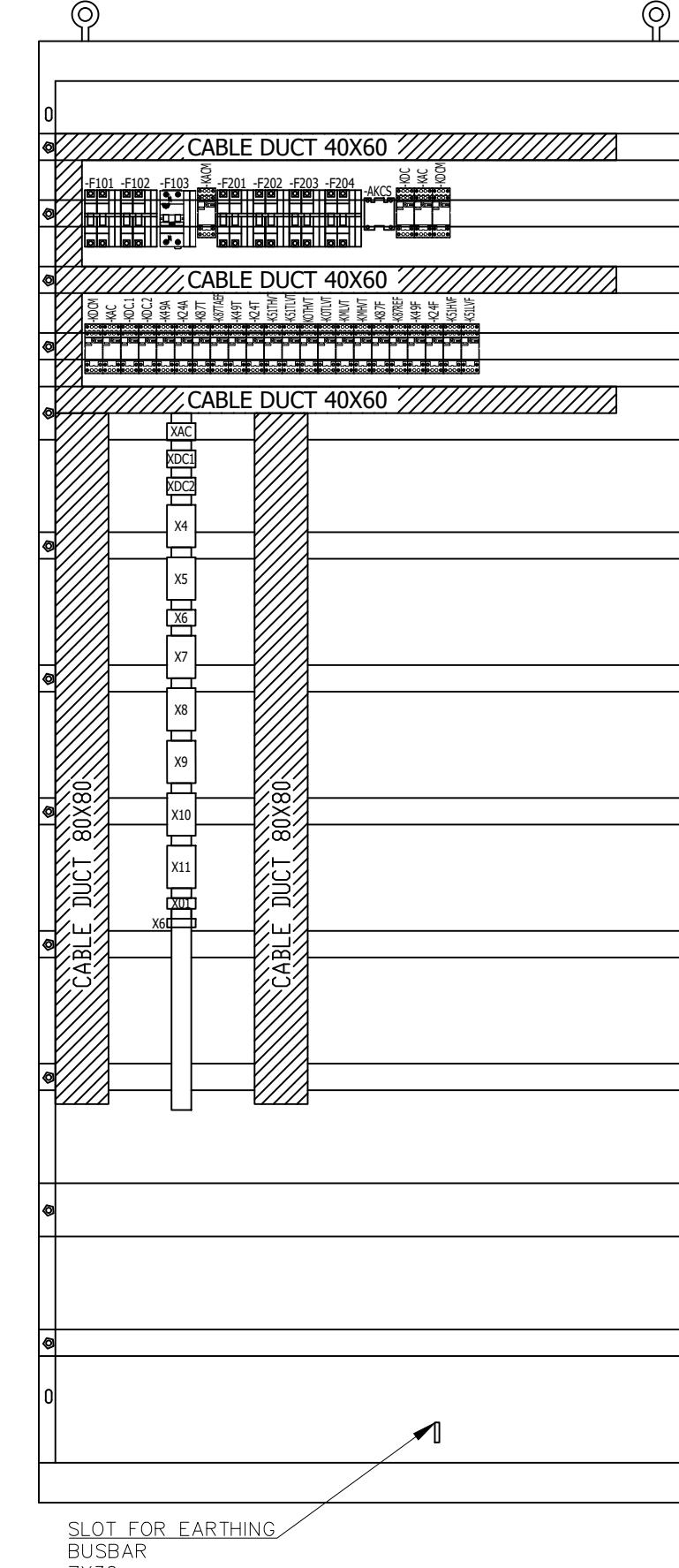
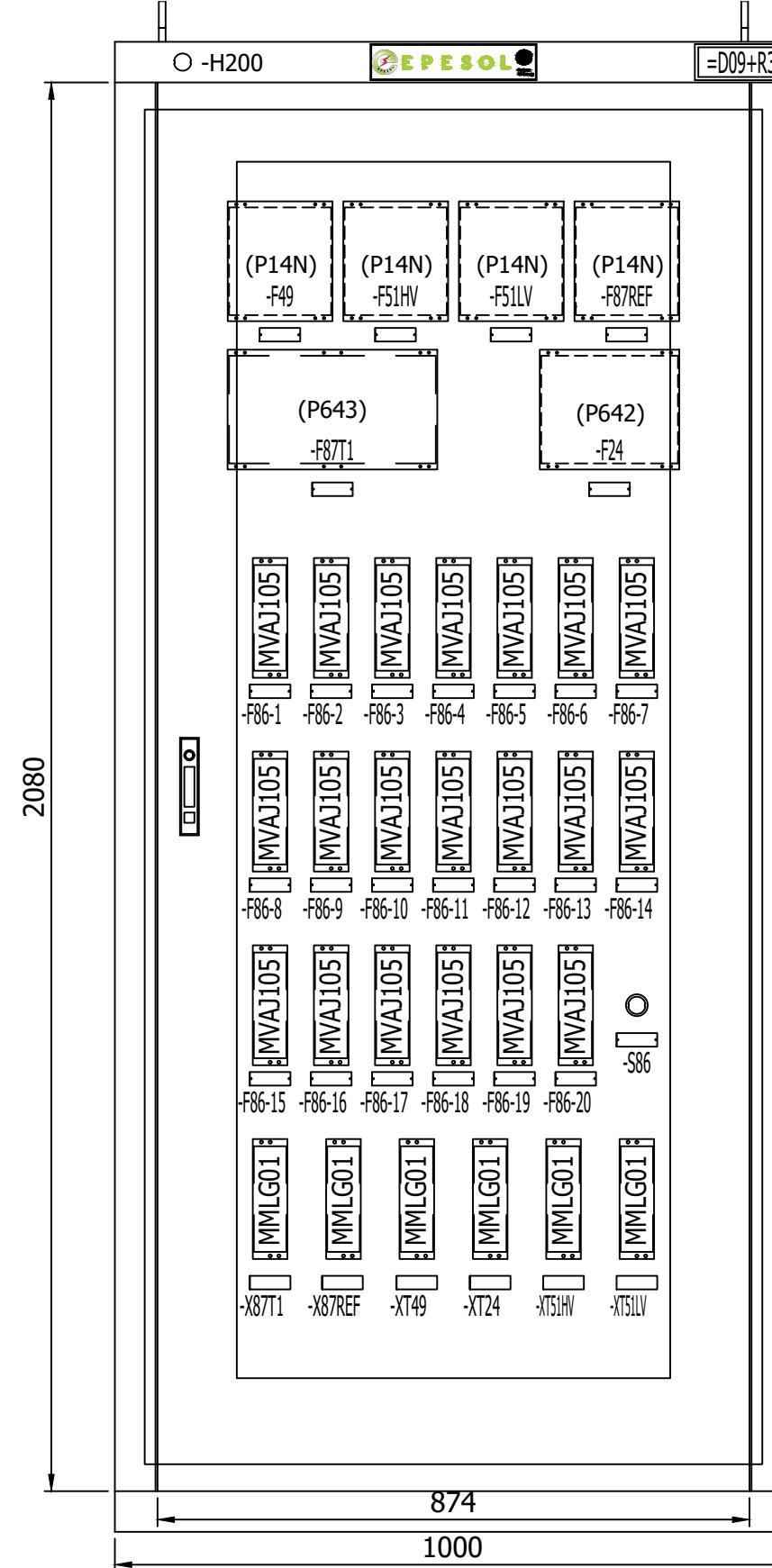
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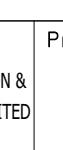
FRONT VIEWLEFT SIDE VIEWRIGHT SIDE VIEW

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0	AS BUILT	22.11.2018	ASJ	Manufacturer EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan
REV.	DESCRIPTION	DATE	DRAWER	Grid Solutions A GE and Alstom joint venture

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)
PANEL VIEW

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

Project no. P-60194 Sheet type AD Sheet no. 05

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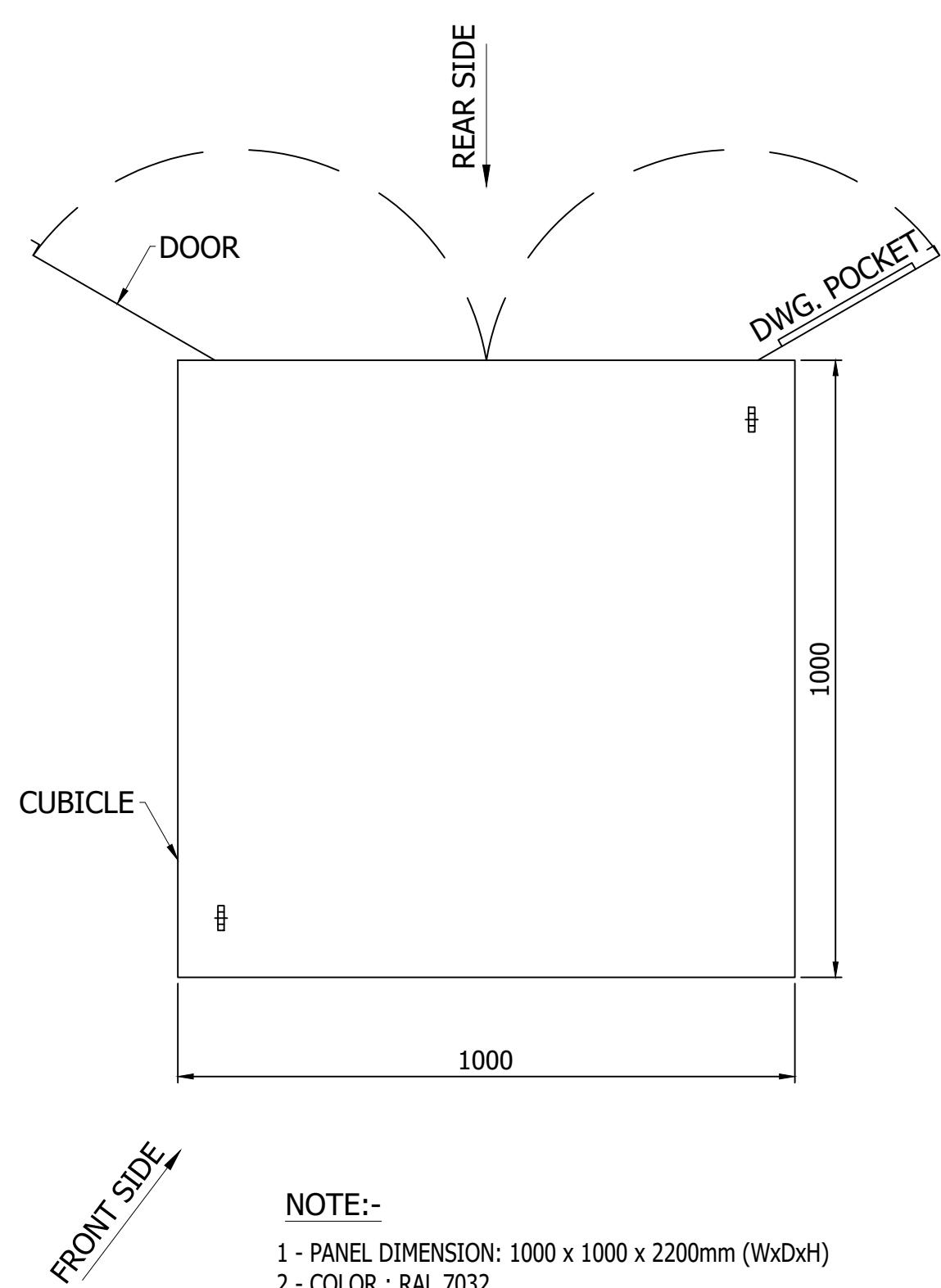
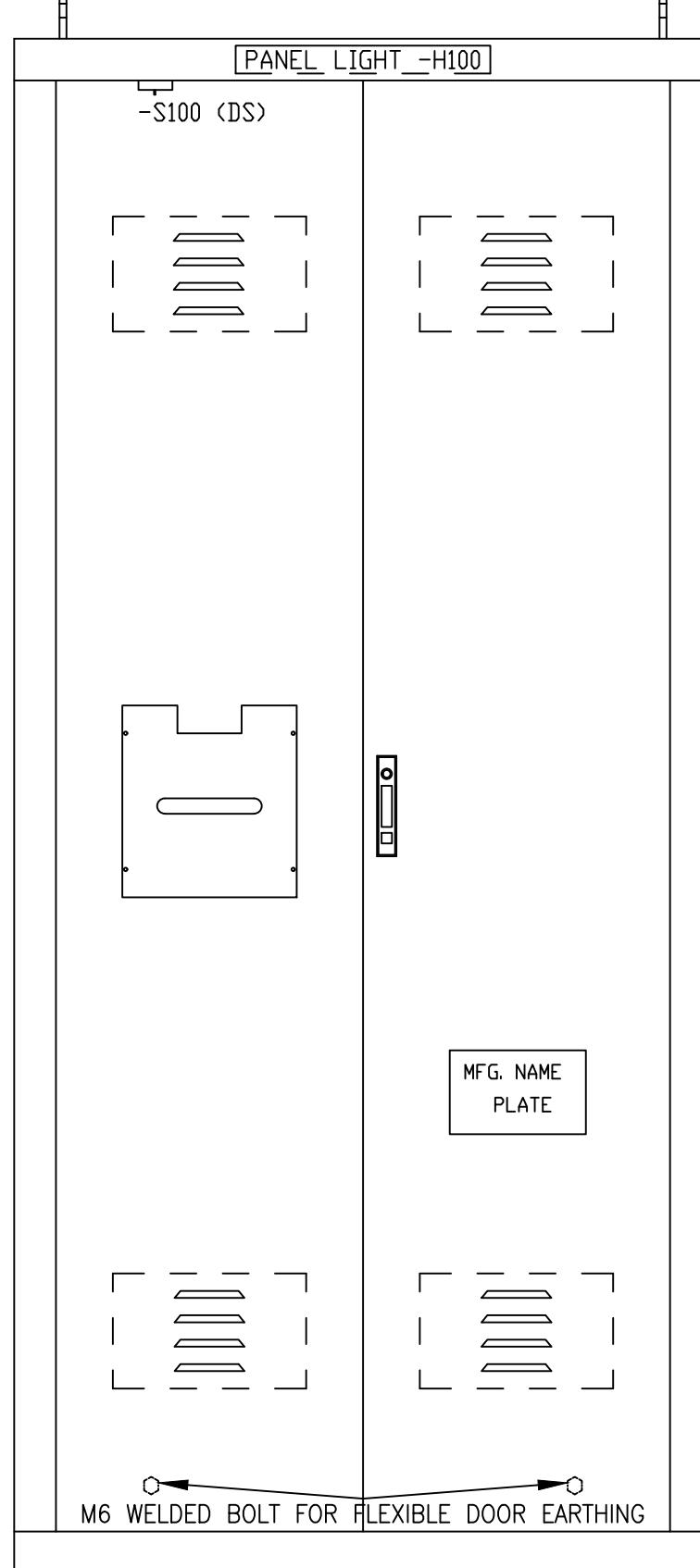
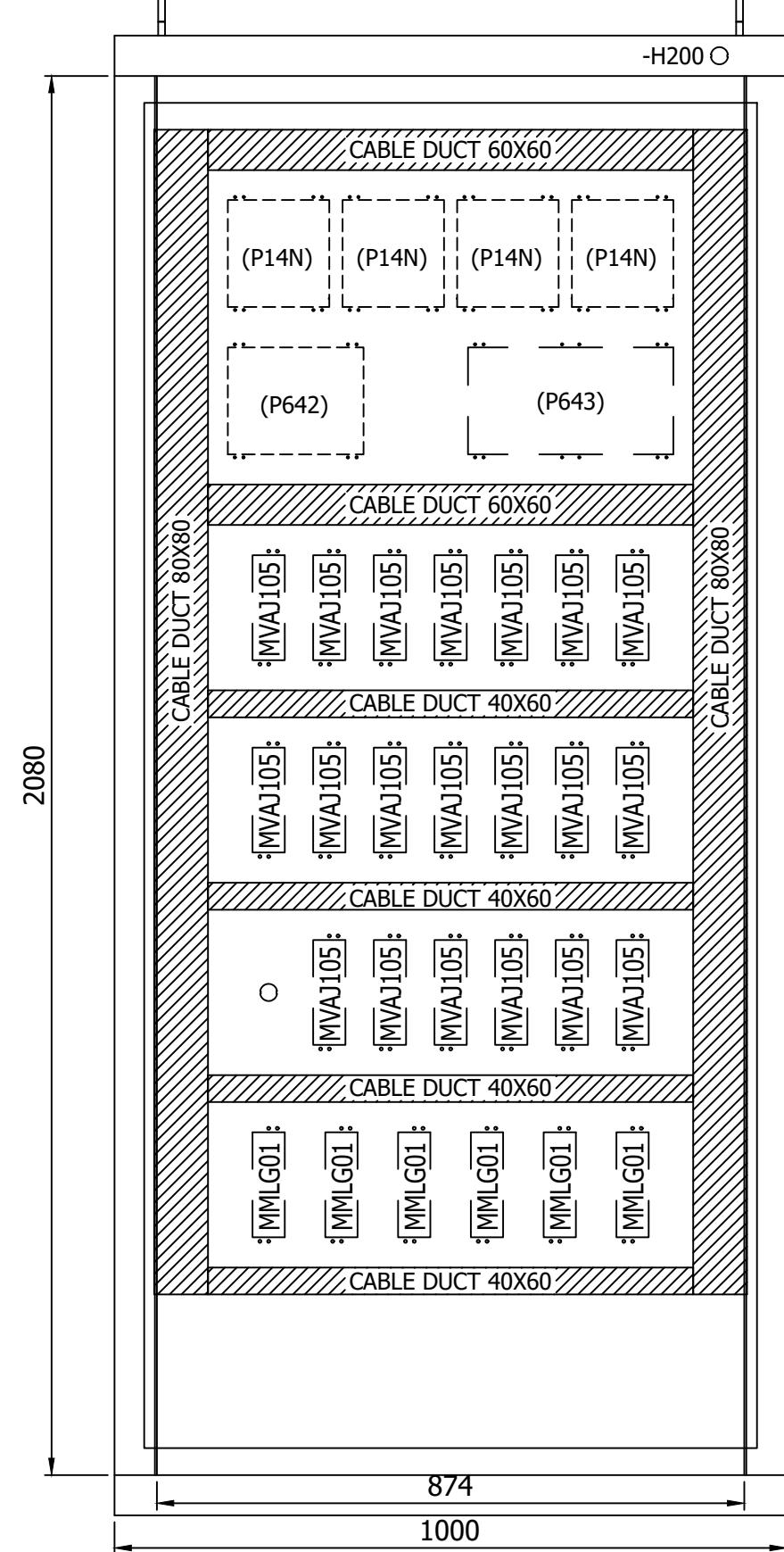
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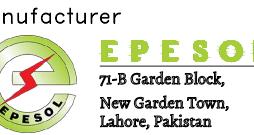
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FRONT VIEWBACK VIEW WITH DOORTOP VIEW

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**NOTE:-**

- 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  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) PANEL VIEW	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AD
									Sheet no. 05

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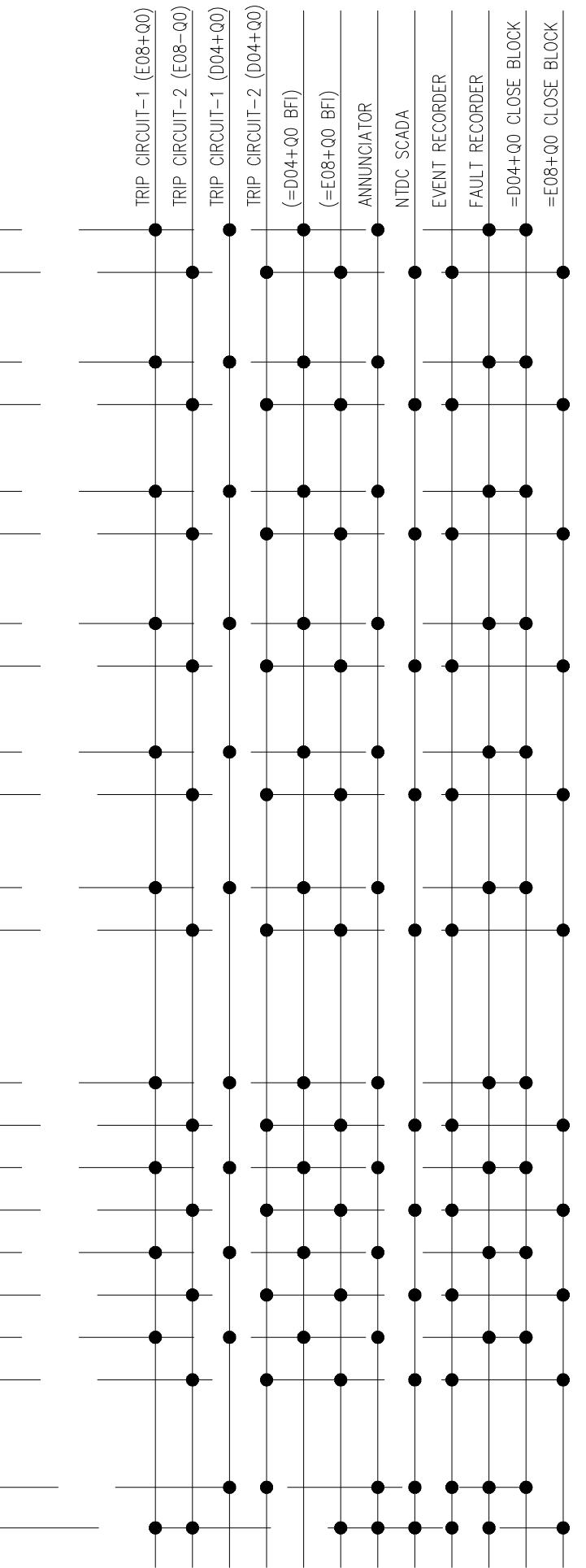
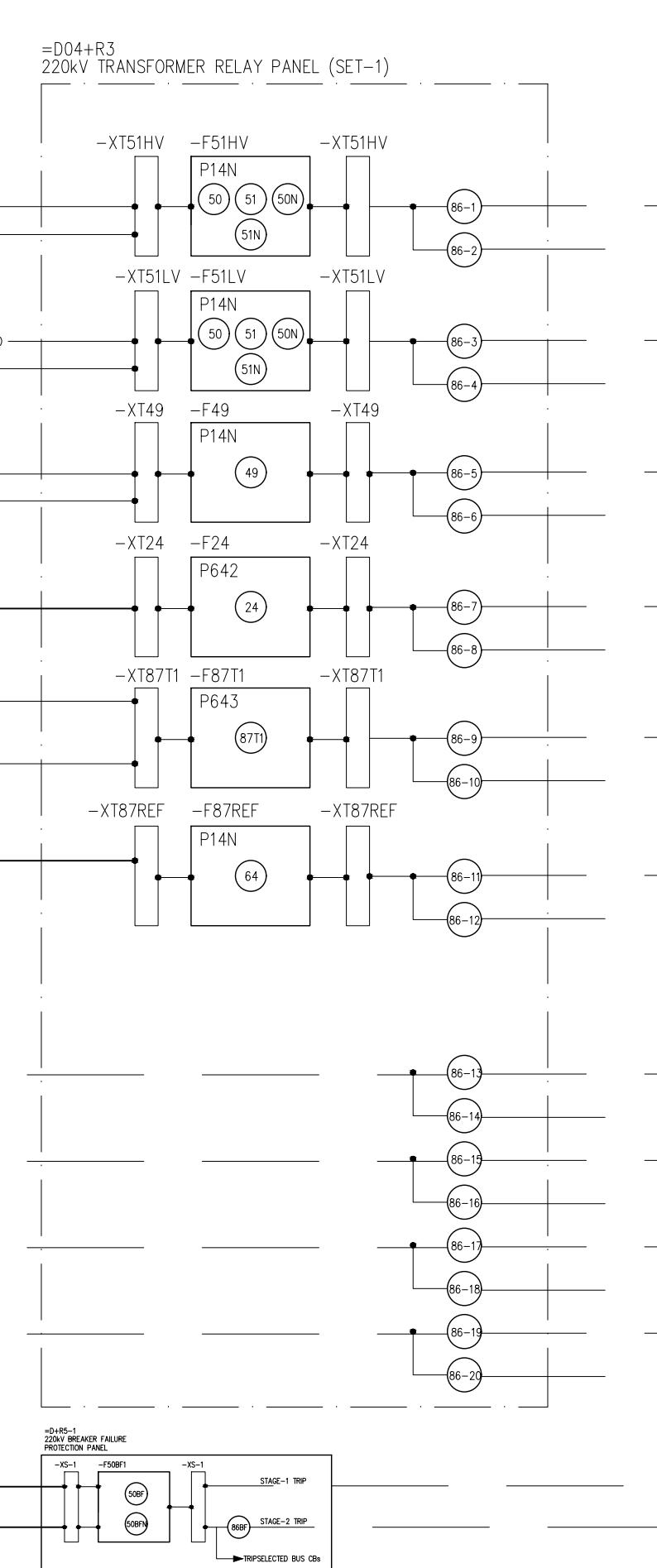
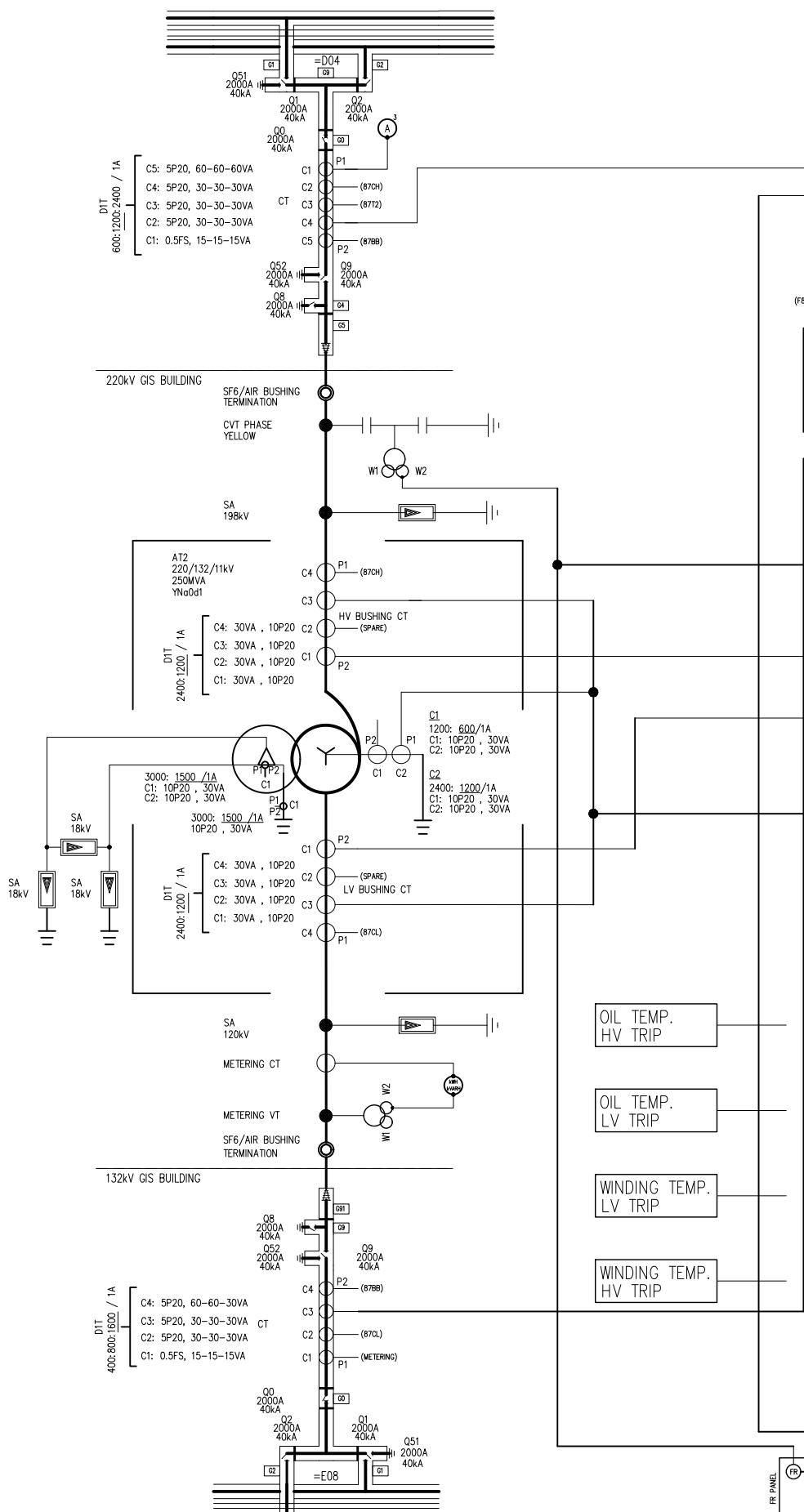
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A

B

C

D

E

F

A

B

C

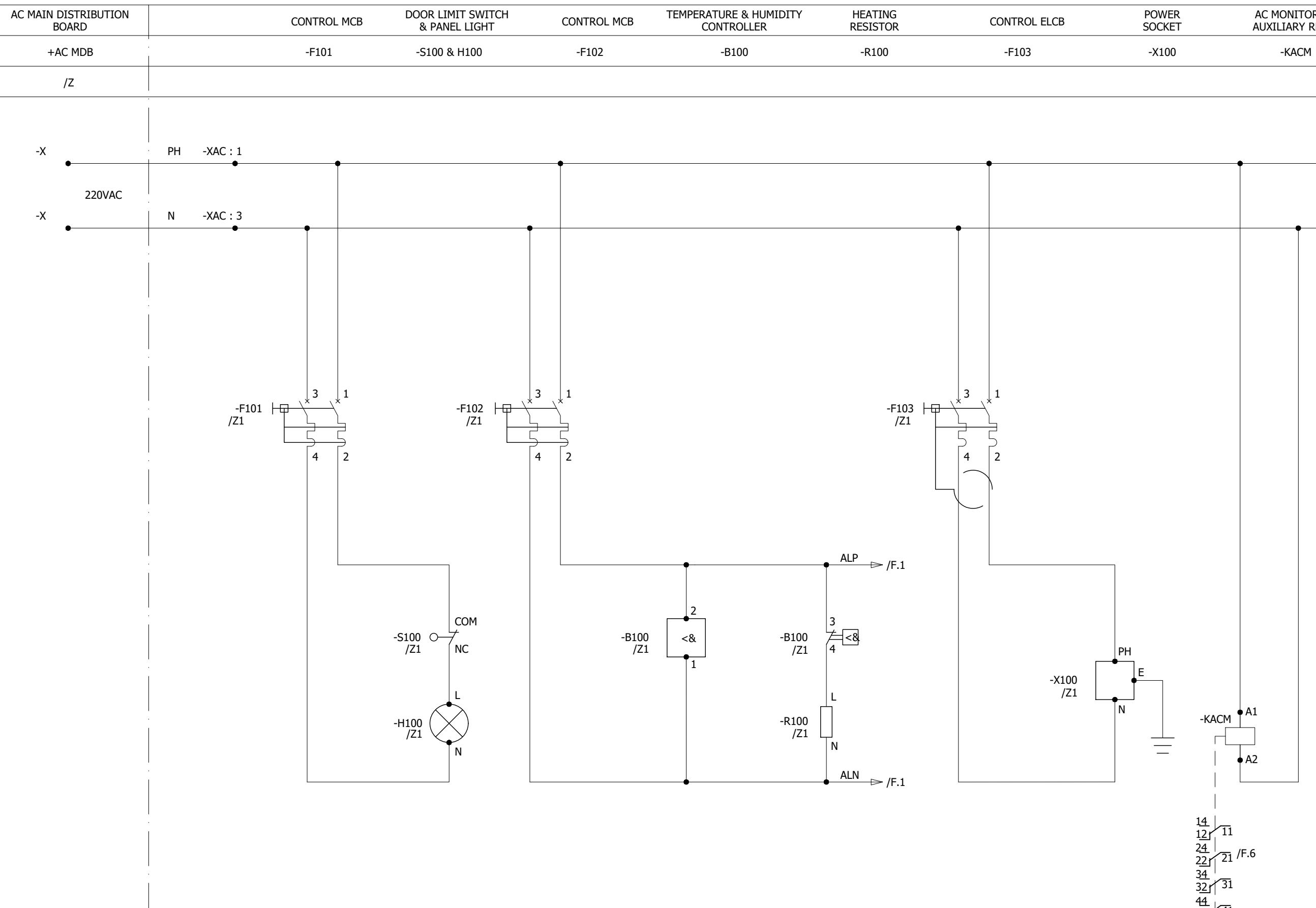
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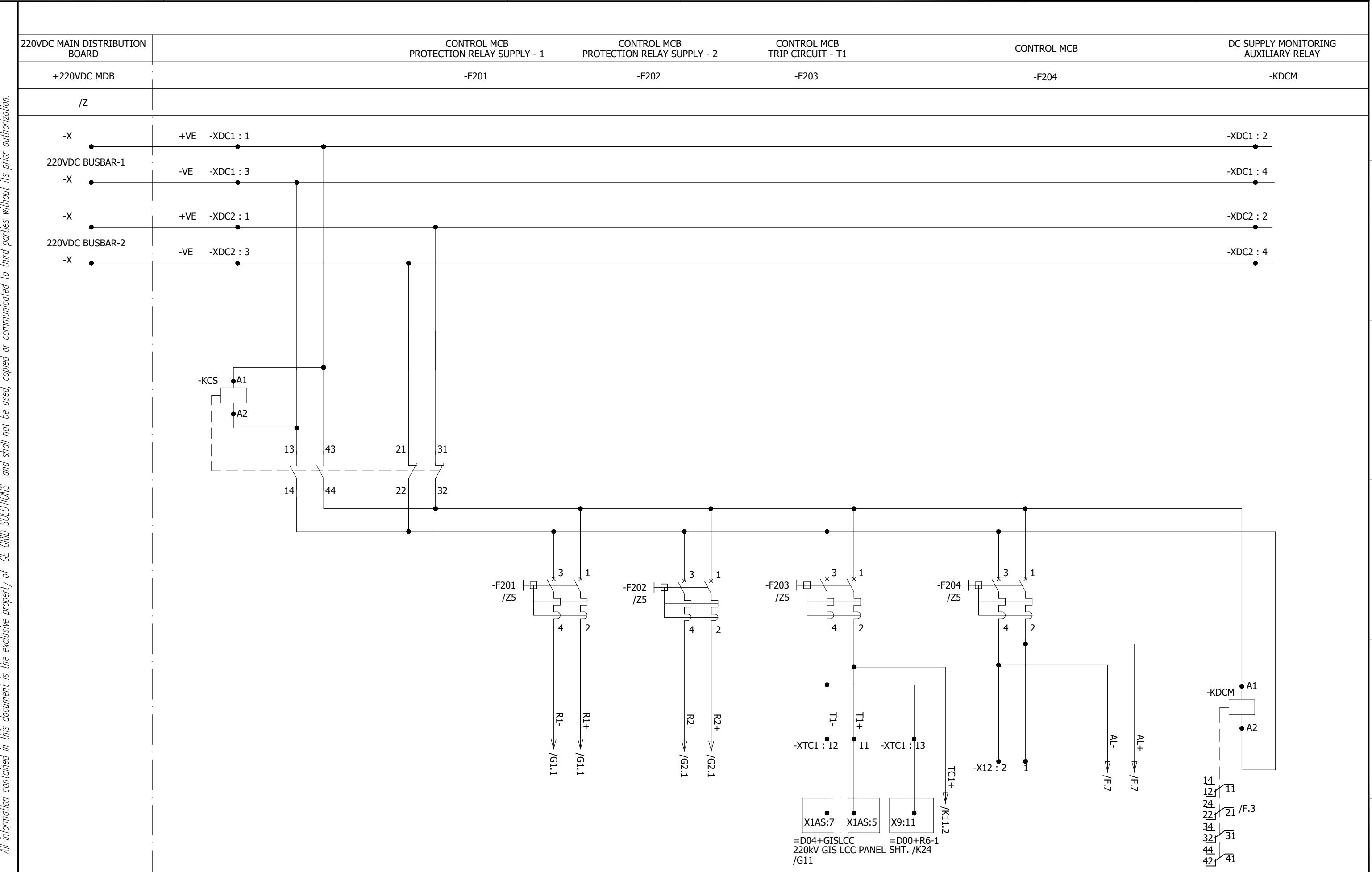
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0	AS BUILT	22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPEPSOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV TRAFO RELAY SET-1 PANEL (=D09+R3) BAY CONCEPT & PROTECTION LOGICS	P-60194-E-DTR-SC-003
									Project no. Drawing no.
1			2						P-60194
3			4						AE
5			6						06
7			8						

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REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194



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 GAZI 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
									Sheet type E
									Sheet no. 08

220V DC CIRCUIT FAULTY

220V DC CIRCUIT FAULTY INDICATION

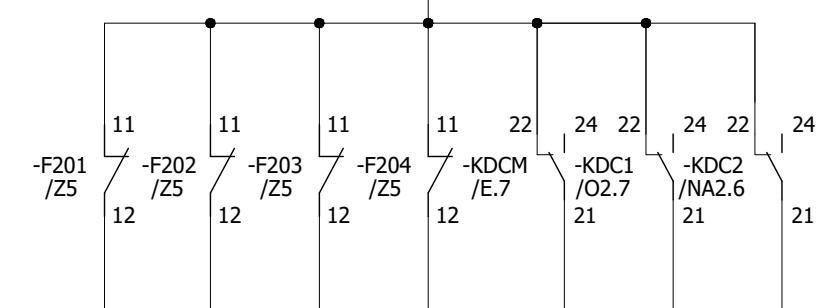
220V AC CIRCUIT FAULTY

-KDC

-H200

-KAC

/D.5 ➤ ALP

42 44
41

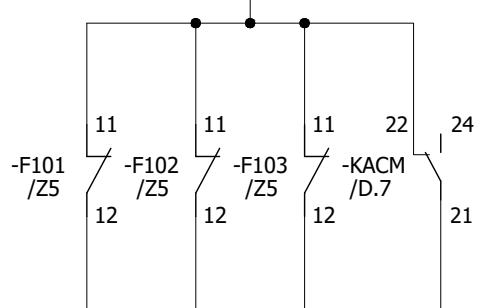
-KDC

A1
A2-H200/Z5
L
N

/D.5 ➤ ALN

14 11 /RA1.7
12 24 /RA2.7
24 22 /RA3.7
34 32 /RA3.7
44 42 /F.5

/E2.7 ➤ AL+

14 11 /RA1.7
12 24 /RA2.7
24 22 /RA3.7
34 32 /RA3.7
44 42 /F.5

/E2.7 ➤ AL-

0

AS BUILT

22.11.2018

ASJ



Contractor



Client



Project

220kV/132kV GIS SUBSTATION
GHAZI ROAD, LAHORE

Title

220kV TRAFO RELAY SET-1 PANEL
(=D09+R3)
AC/DC SUPPLY FAILURE CIRCUITDrawing no.
P60194-E-DTR-SC-003

Project no. P-60194 Sheet type F Sheet no. 09

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REV.	DESCRIPTION	DATE	DRAWER
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TRAFO DIFF. RELAY

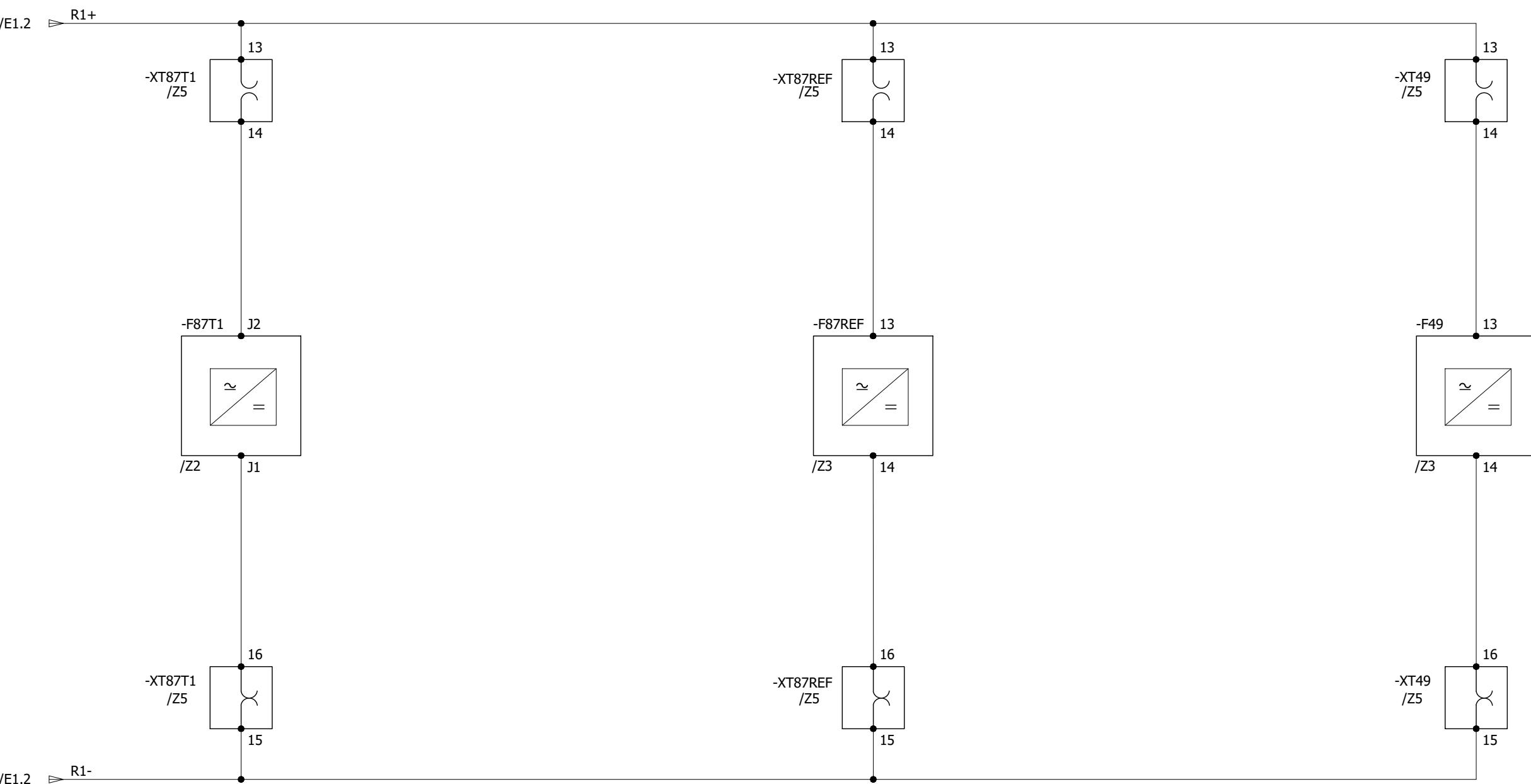
REF RELAY

THERMAL O/L RELAY

RELAY SUPPLY

RELAY SUPPLY

RELAY SUPPLY



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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type G1
									Sheet no. 10

OVER EXCITATION RELAY

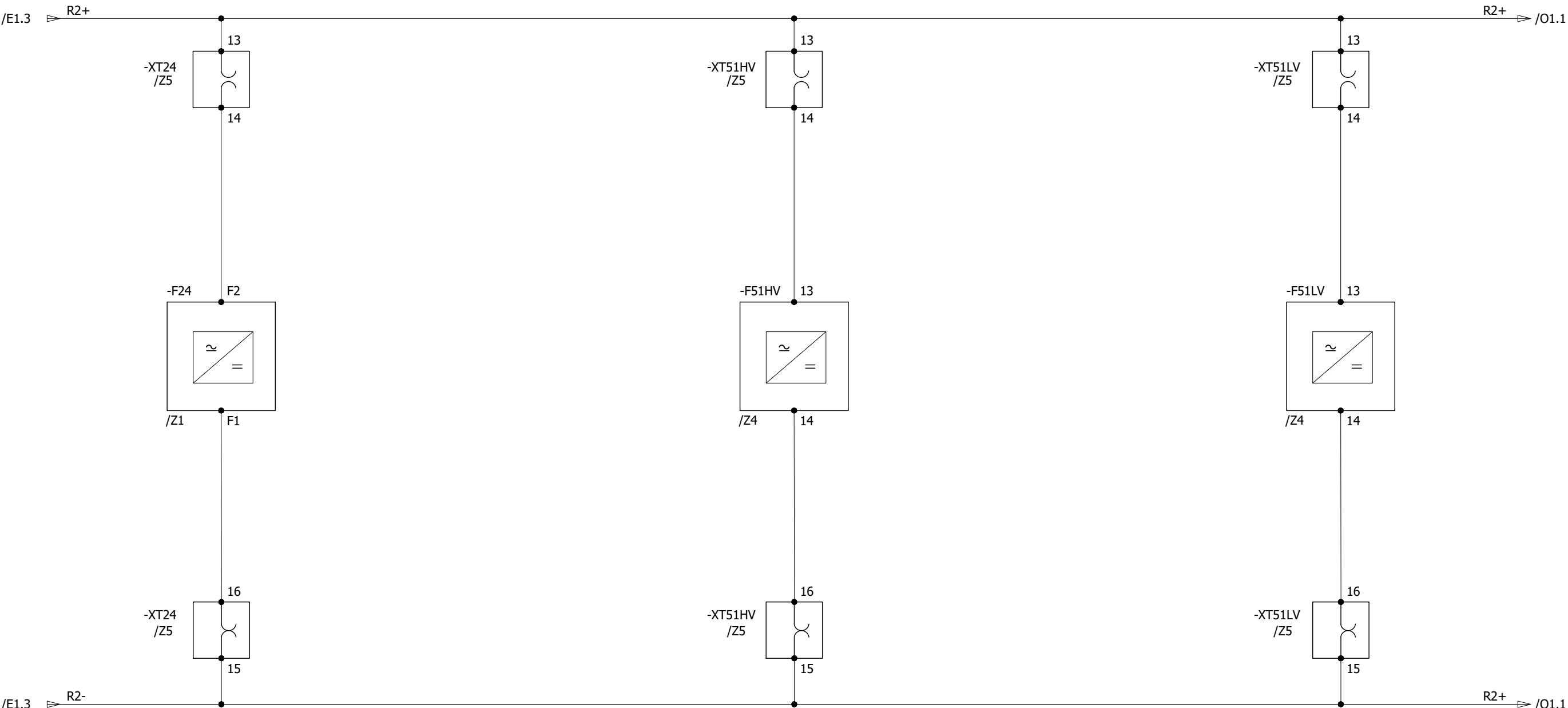
HV OC/EF RELAY

LV OC/EF RELAY

RELAY SUPPLY

RELAY SUPPLY

RELAY SUPPLY

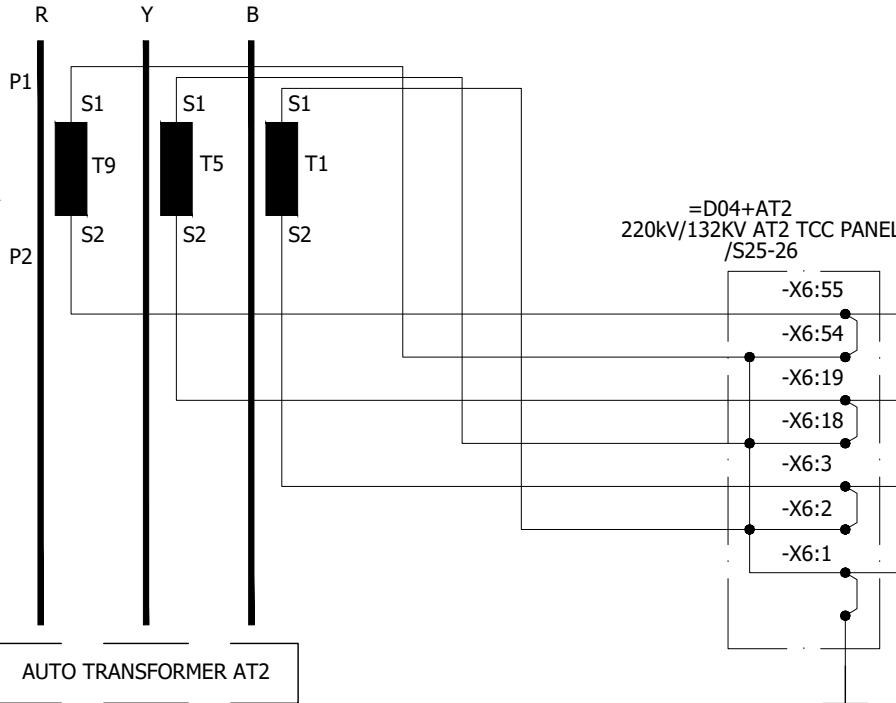


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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type G2
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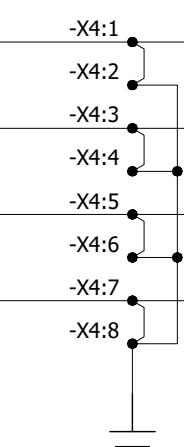
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HV SIDE BUSHING CT

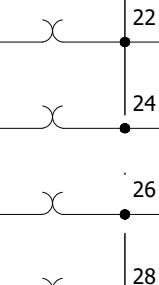


CONTROL ROOM

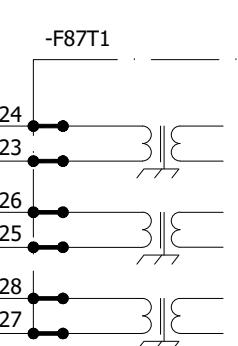
=D04+AT2
220kV/132KV AT2 TCC PANEL
/S25-26



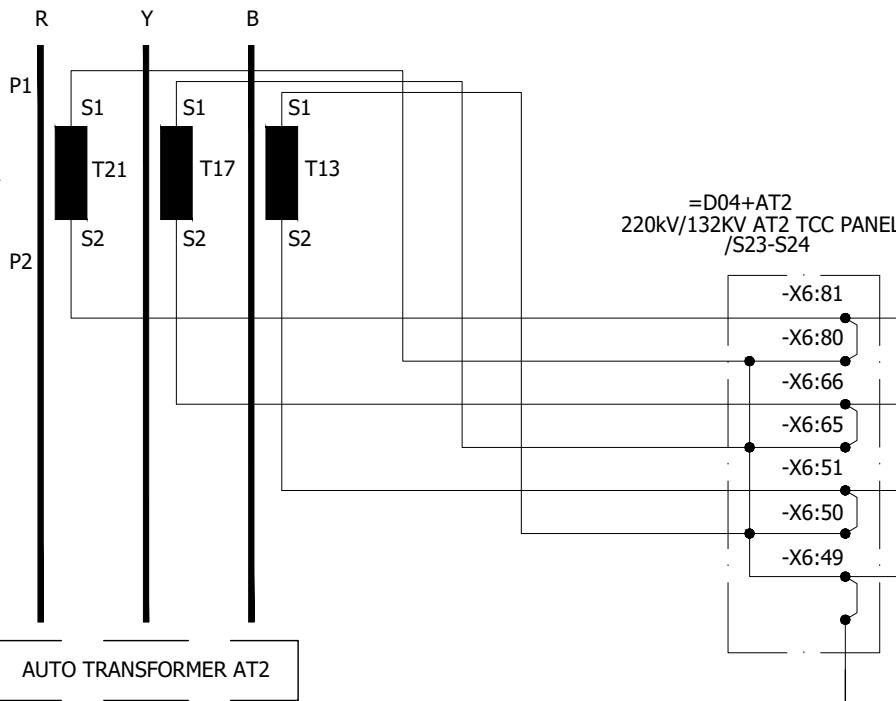
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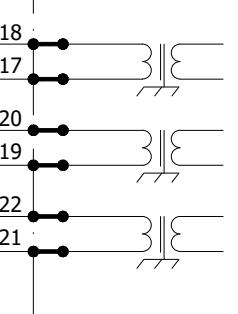
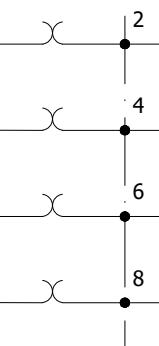
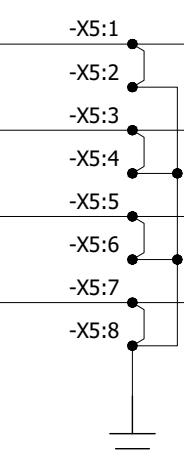
-F87T1



LV SIDE BUSHING CT



=D04+AT2
220kV/132KV AT2 TCC PANEL
/S23-S24



AGILE P643 TRANSFORMER DIFFERENTIAL PROTECTION RELAY

TEST BLOCK

-XT87T1

/Z5

TRAFO DIFFERENCE PROTECTION RELAY

-F87T1

/Z2

0	AS BUILT	22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
				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 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

TEST BLOCK

MTEROSIL

LIMITING RESISTOR

RESTRICTED EARTH FAULT RELAY

-XT87

-M1

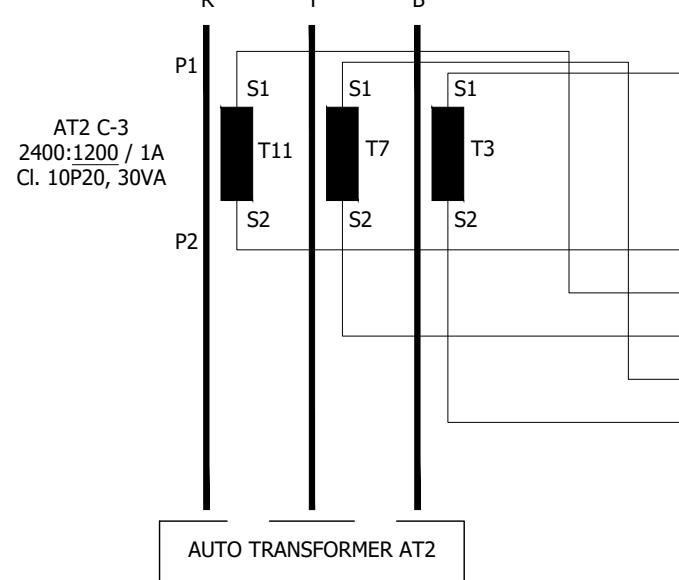
-RS1

-F87REF

/Z3

CONTROL ROOM

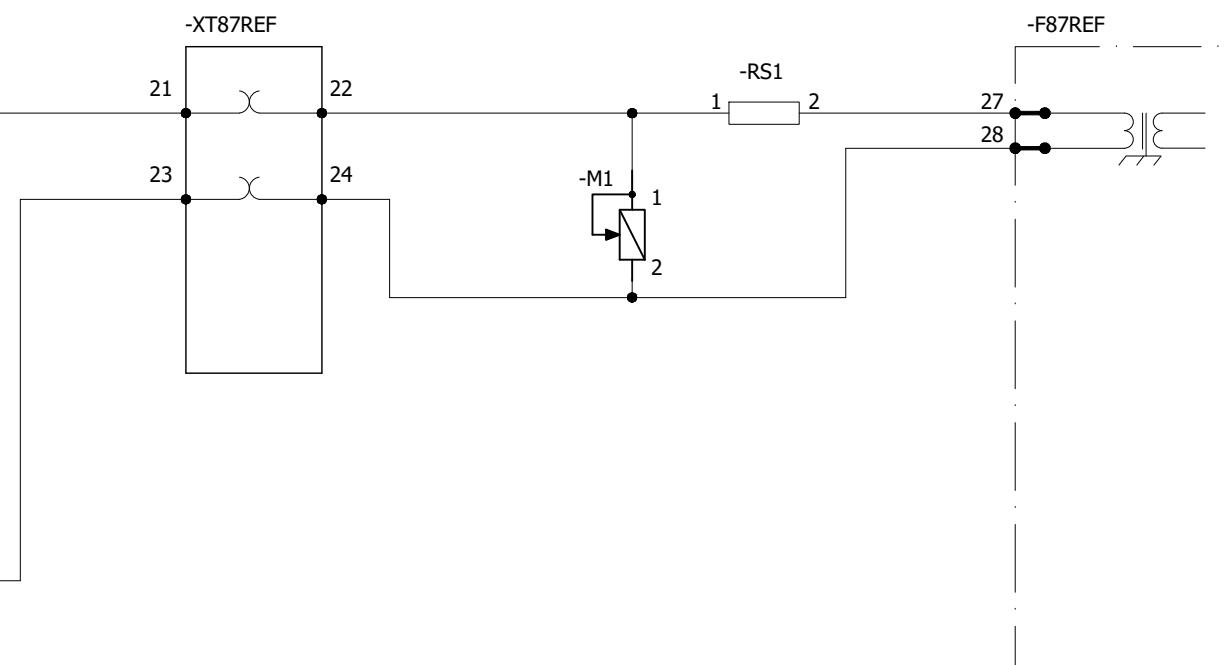
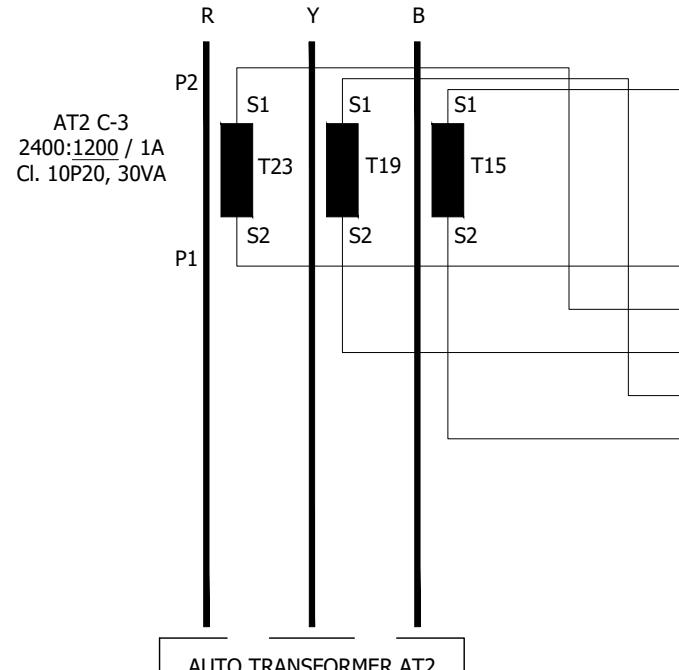
HV SIDE BUSHING CT



=D04+AT2
220kV/132kV AT2 TCC PANEL
/S23-S26

AT2 NEUTRAL
AT2 HV-NEUTRAL CT C2
1200:600 / 1A
Cl. 10P20, 30VA

LV SIDE BUSHING CT



AGILE P14N REF PROTECTION RELAY

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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPEPSOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) REF PROTECTION CT CIRCUIT	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type H2
									Sheet no. 13

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132KV GIS LCC
PANEL

=E08

/MA1

TEST BLOCK

THERMAL OVERLOAD
RELAY

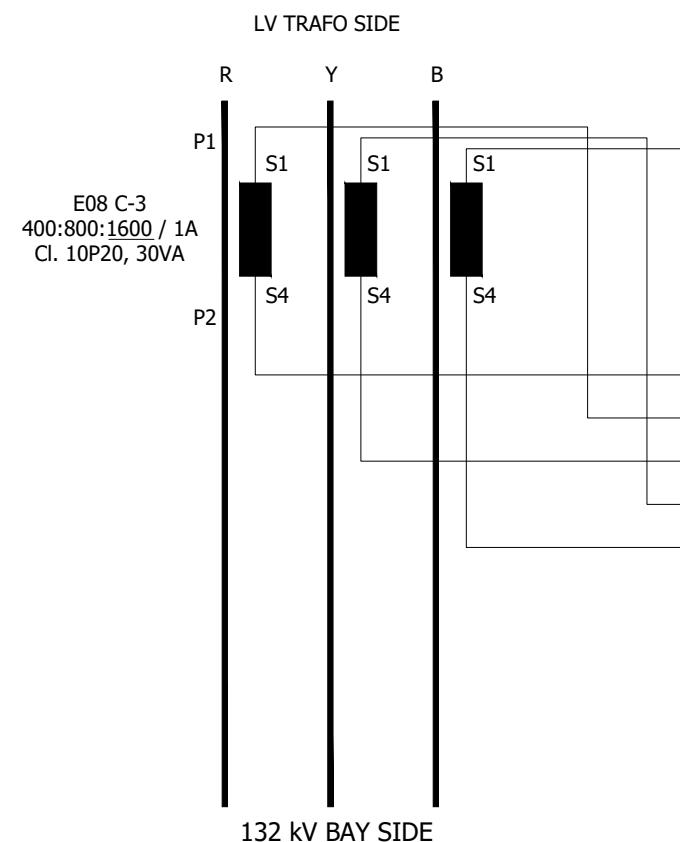
-XT49

-F49

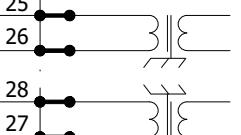
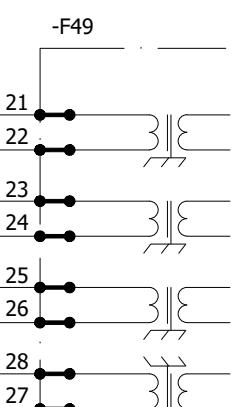
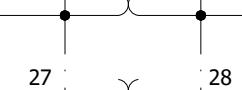
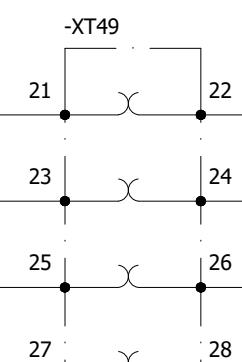
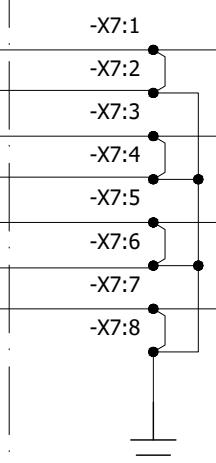
/Z5

/Z3

132KV GIS HALL CONTROL ROOM



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



AGILE P14N THERMAL OVERLOAD PROTECTION RELAY



A

A

B

B

C

C

D

D

E

E

F

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) 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

TEST BLOCK

OVER EXCITATION
RELAY

=D04 + CVT KIOSK

-XT24

-F24

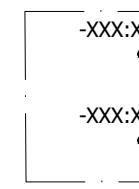
/MA1

/Z5

/Z1

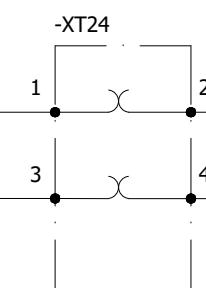
CONTROL ROOM

=CVT KIOSK
RY PHASE
/S81



-X01:1

-X01:2



-XT24

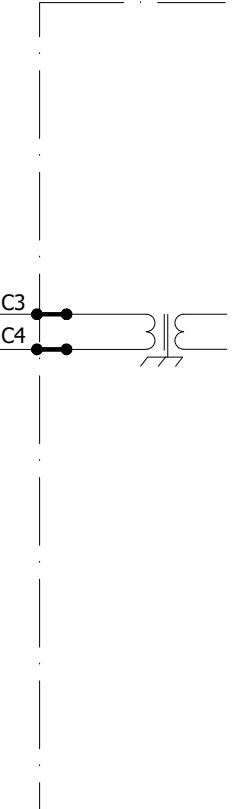
1

3

2

4

-F24



AGILE P642 OVER EXCITATION PROTECTION RELAY

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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) OVER EXCITATION RELAY VT INPUTS	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194

220KV GIS LCC
PANEL

TEST BLOCK

HV OCP/EFP
RELAY

=D04

-XT51HV

-F51HV

/MA1

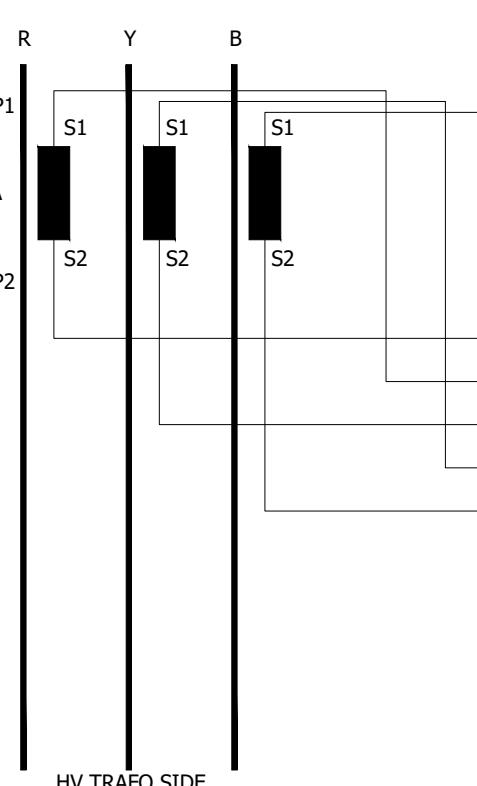
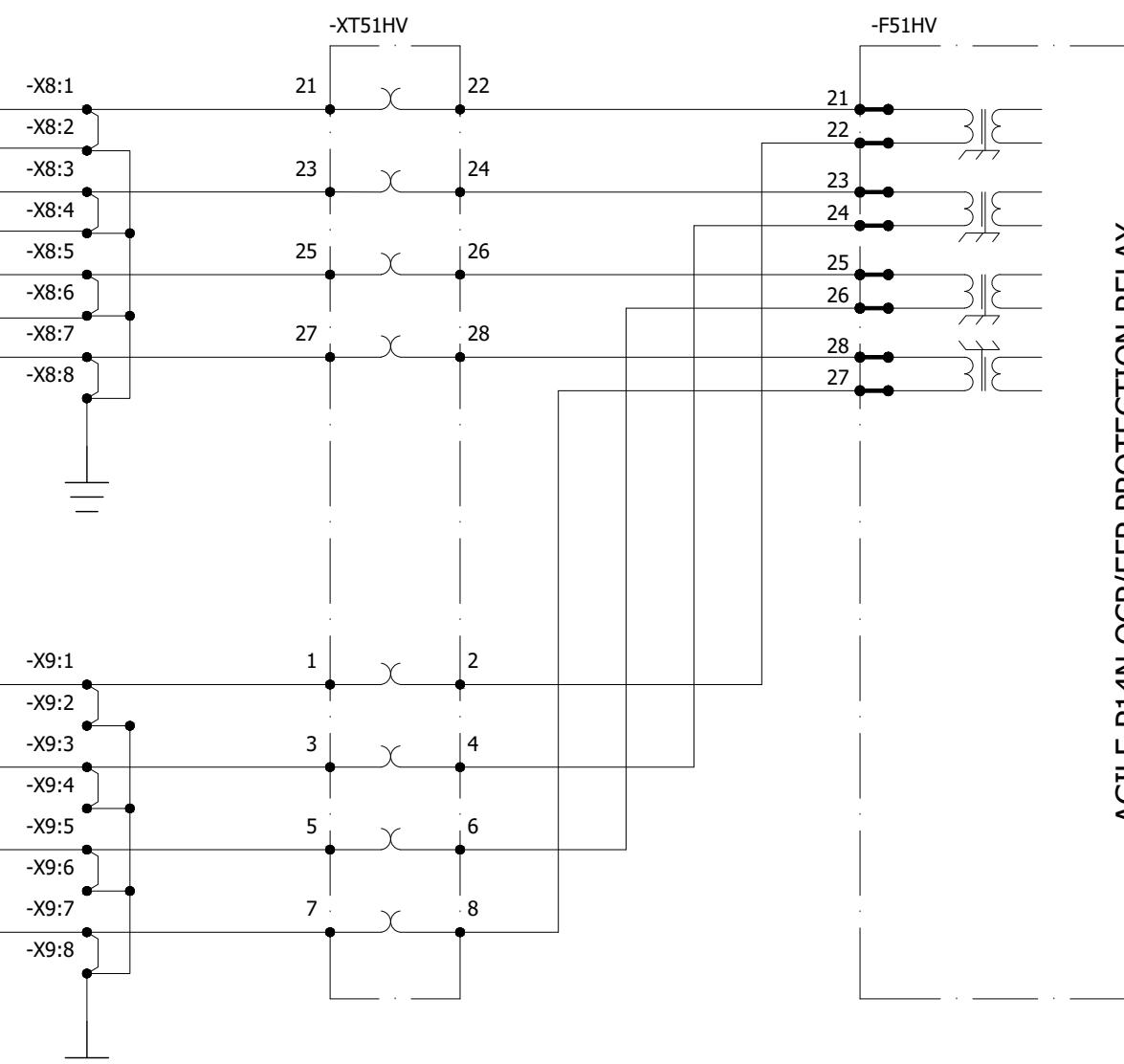
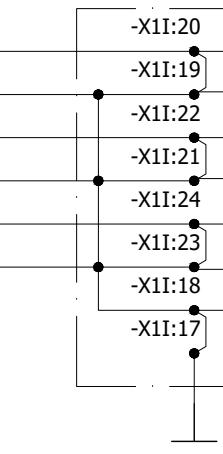
/Z5

/Z4

220KV GIS HALL CONTROL ROOM

D04 BAY SIDE

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D04 CORE-4
600:1200:2400 / 1A
Cl. 5P20, 30VA=D04+GISLCC
220KV GIS LCC PANEL
/S81

AGILE P14N OCP/EFP PROTECTION RELAY

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) HV OCP/EFP RELAY CT INPUTS	Drawing no. P60194-E-DTR-SC-003	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type H5	Sheet no. 16

TEST BLOCK

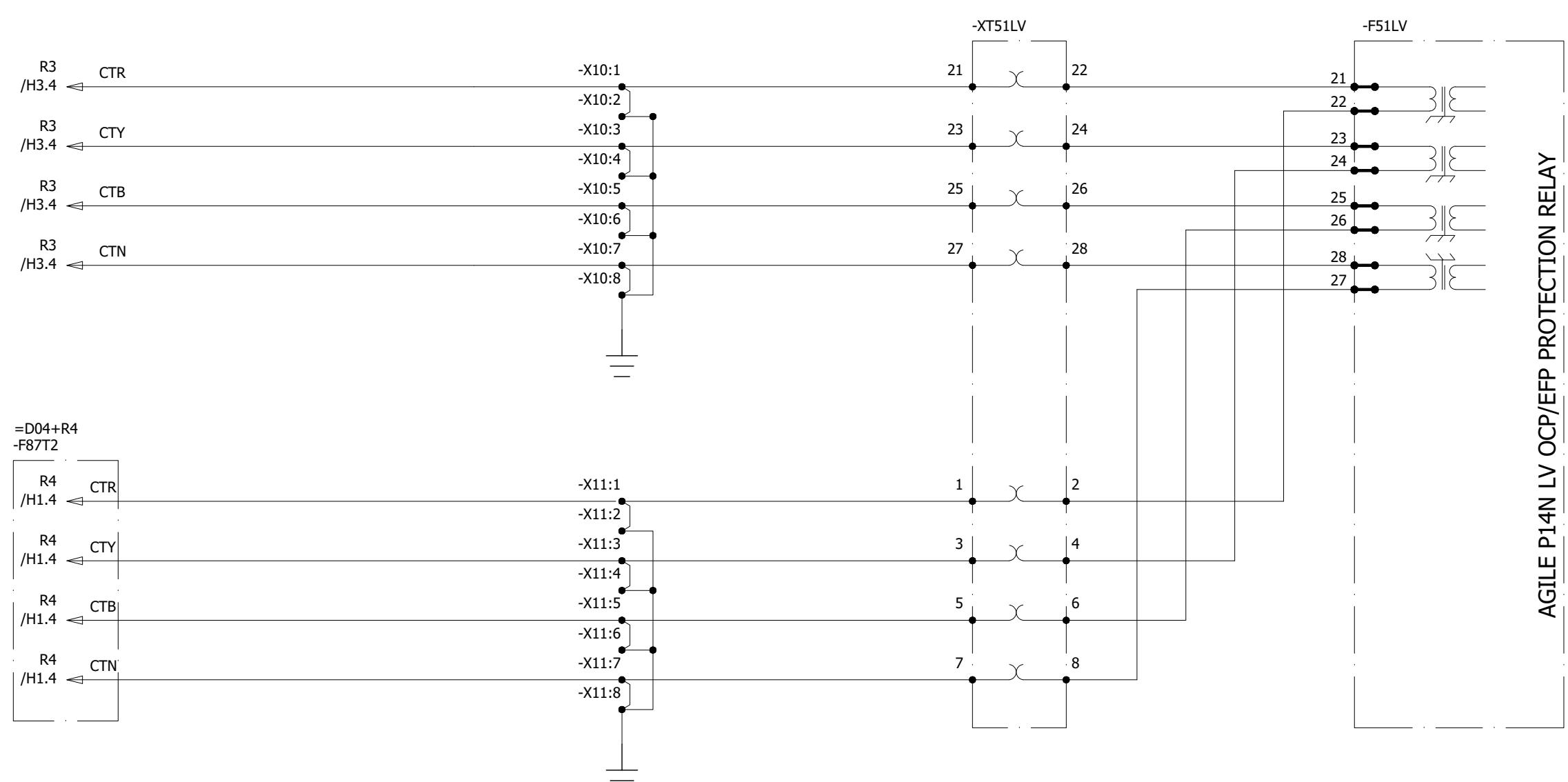
LV OCP/EFP
RELAY

-XT51LV

-F51LV

/Z5

/Z4



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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) 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

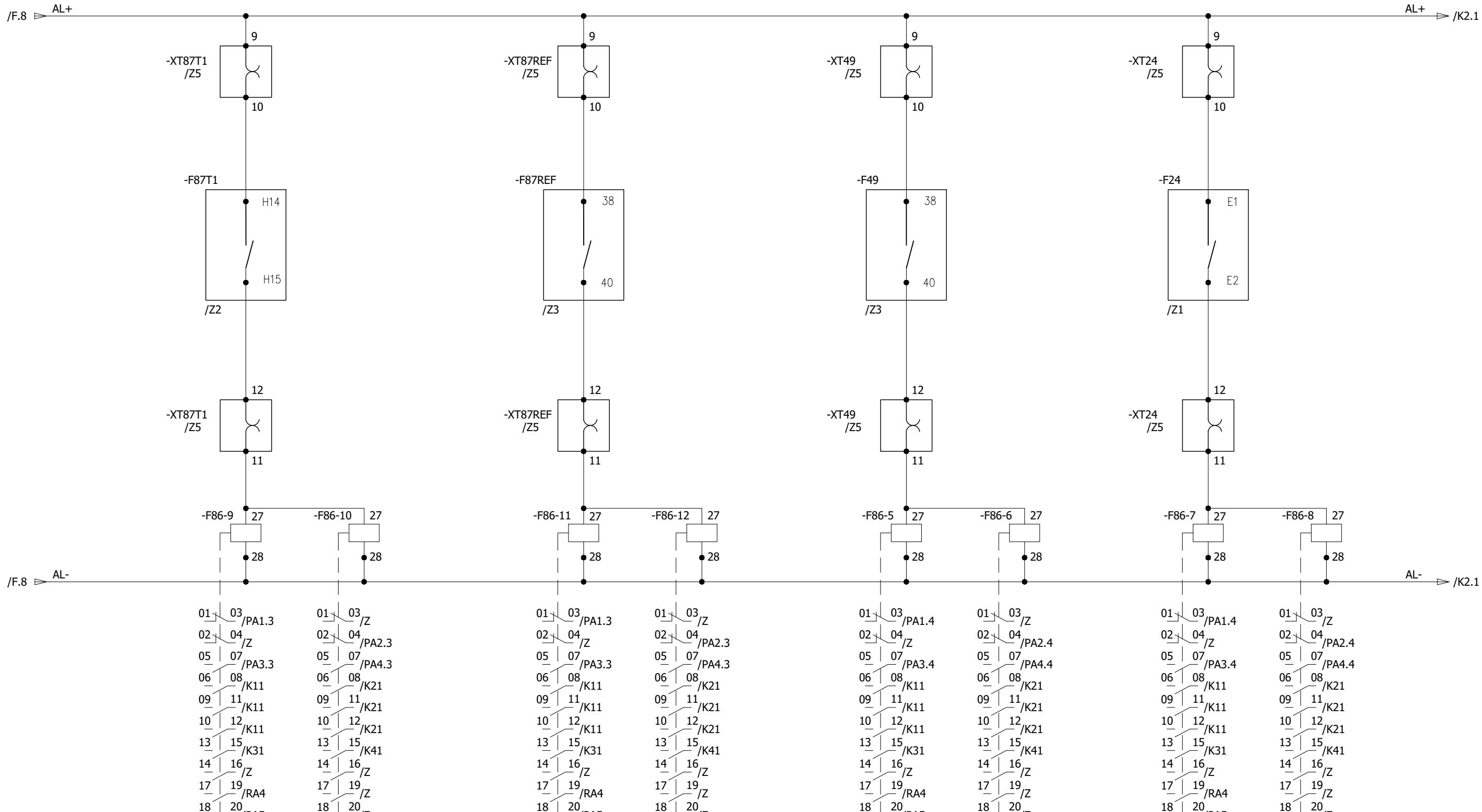
DIFFERENTIAL PROTECTION TRIP

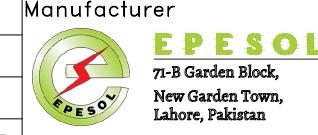
REF PROTECTION TRIP

THERMAL OVERLOAD PROTECTION TRIP

OVER EXCITATION PROTECTION TRIP

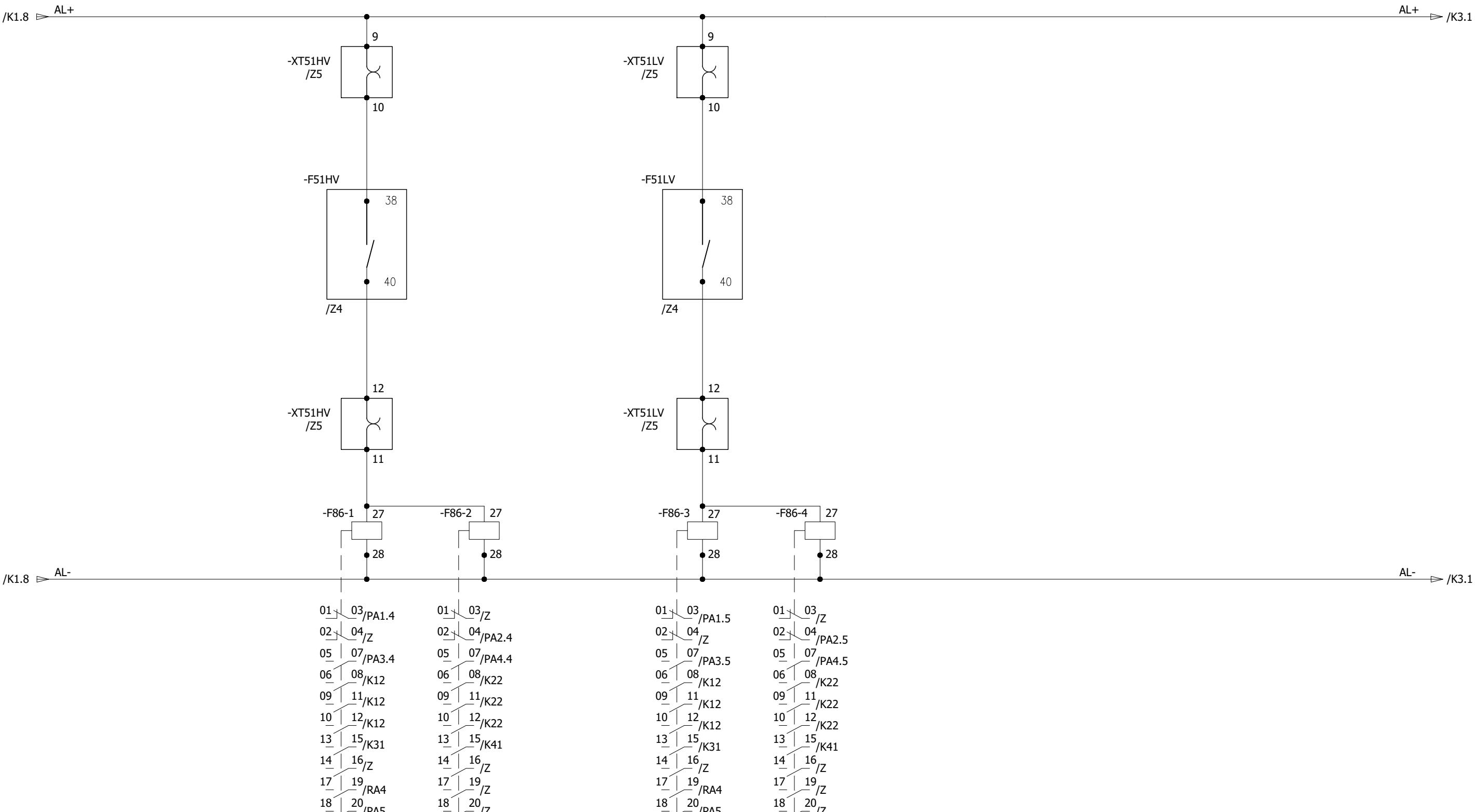
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0	AS BUILT		22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
					 EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	 Grid Solutions A GE and Alstom joint venture	 NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED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

HV OC/EF PROTECTION TRIP

LV OC/EF PROTECTION TRIP



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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPEPSOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GAZI 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 K2
									Sheet no 19

OIL TEMP. HV TRIP

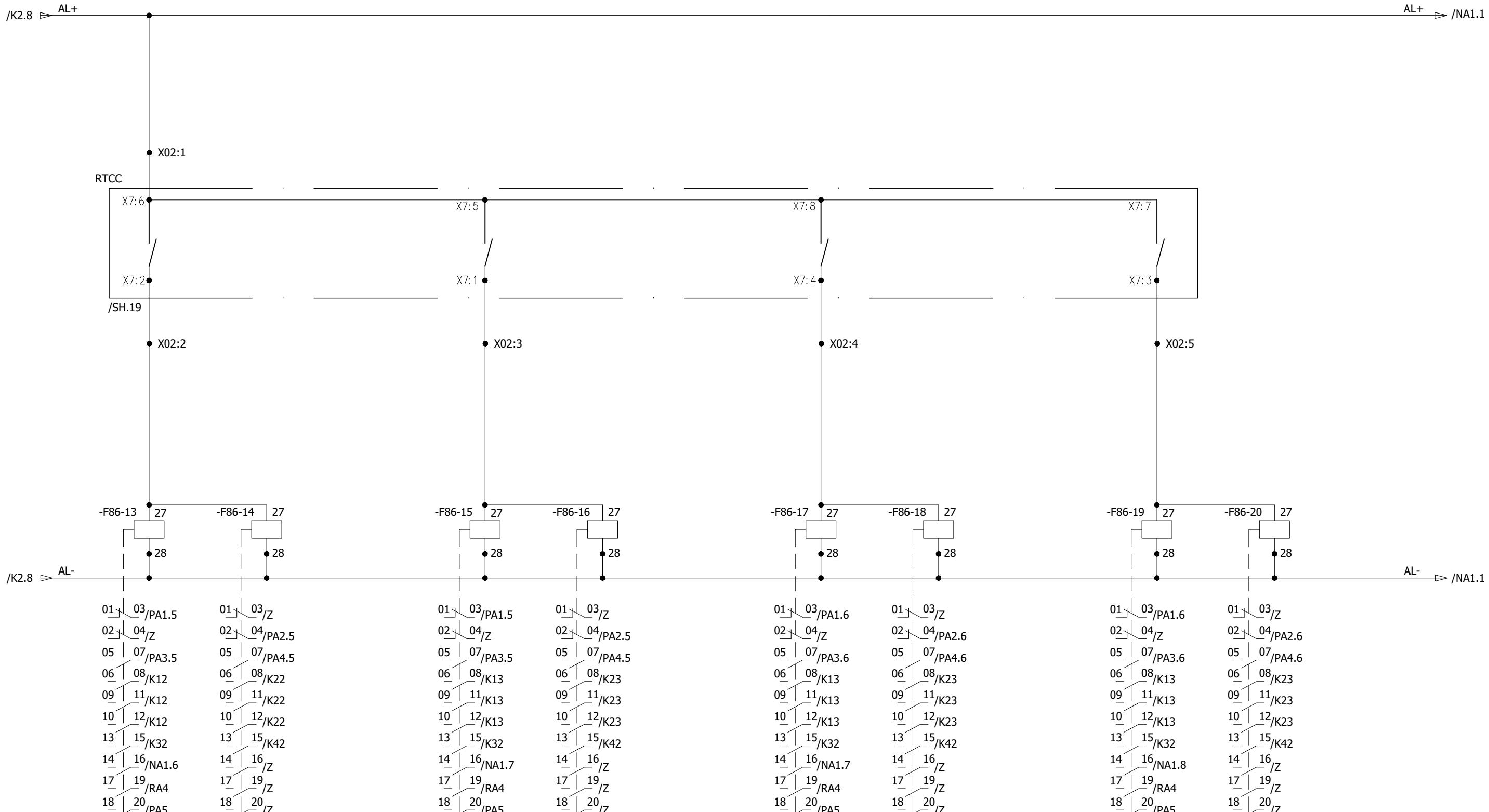
OIL TEMP. LV TRIP

WINDING TEMP. HV TRIP

WINDING TEMP. LV TRIP

DC MONITORING

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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPEPSOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION TRIPS	Drawing no. P60194-E-DTR-SC-003		
									Project no.	Sheet type	Sheet no.
REV.	DESCRIPTION	DATE	DRAWER						P-60194	K3	20

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

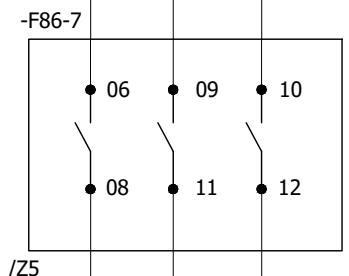
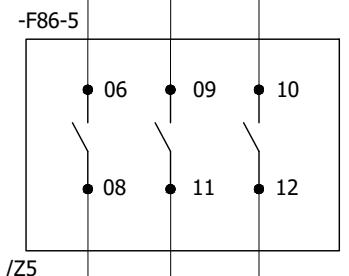
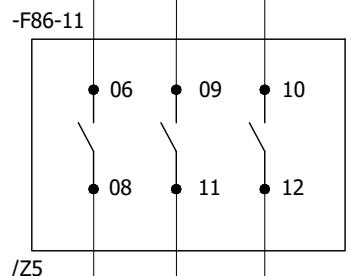
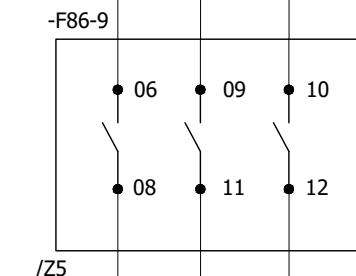
R-PH Y-PH B-PH

R-PH Y-PH B-PH

R-PH Y-PH B-PH

/L52

-XTC1 : 1 TC1+ /E.5 ➔



-X0 : 13 -XTC1 : 2 ➔ /K12.2
-X0 : 14 -XTC1 : 3 ➔ /K12.2
-X0 : 15 -XTC1 : 4 ➔ /K12.2

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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 - 1	Drawing no. P60194-E-DTR-SC-003
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type K11
									Sheet no. 21

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HV OC/EF PROTECTION TRIPS

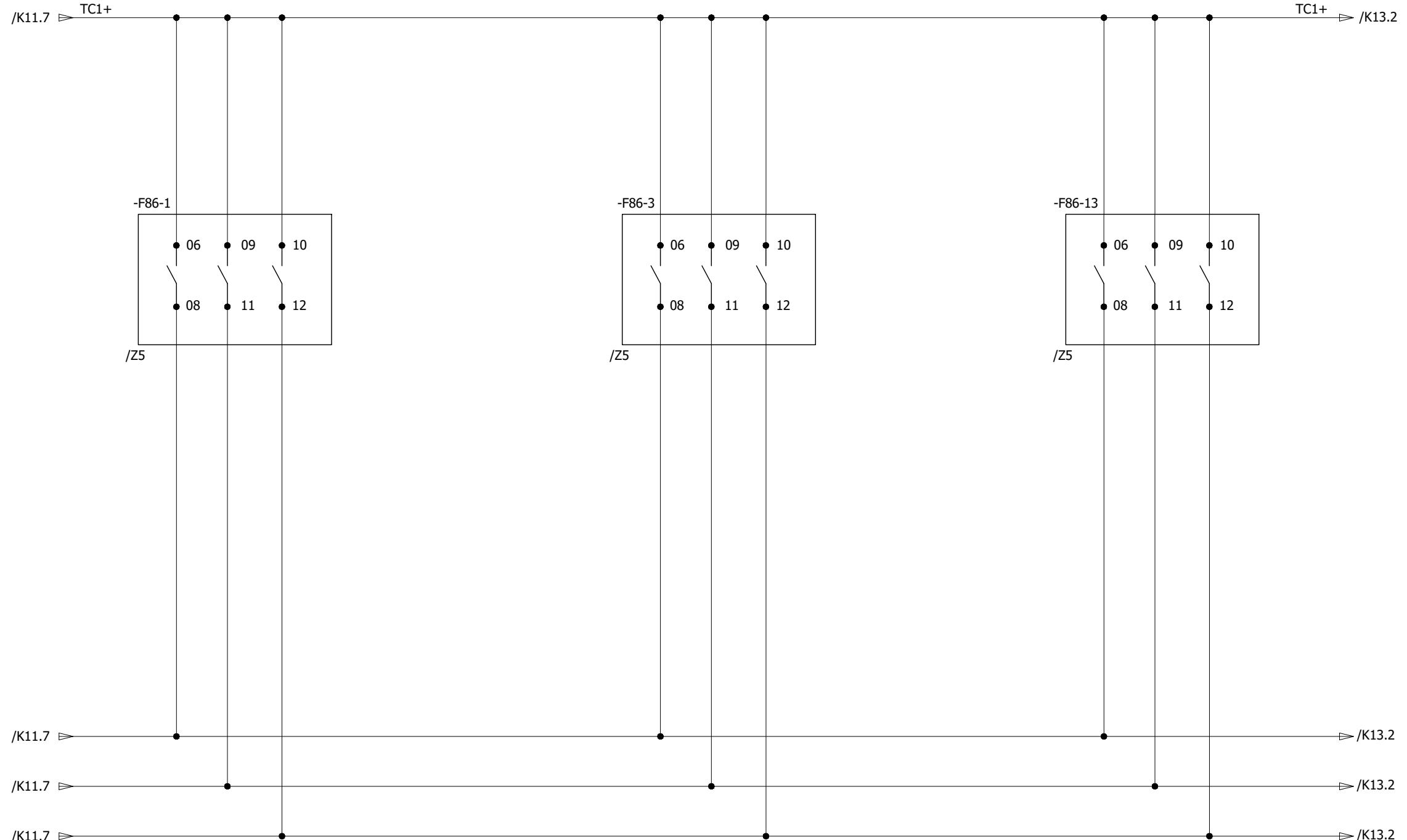
R-PH Y-PH B-PH

LV OC/EF PROTECTION TRIPS

R-PH Y-PH B-PH

OIL TEMP. HV TRIPS

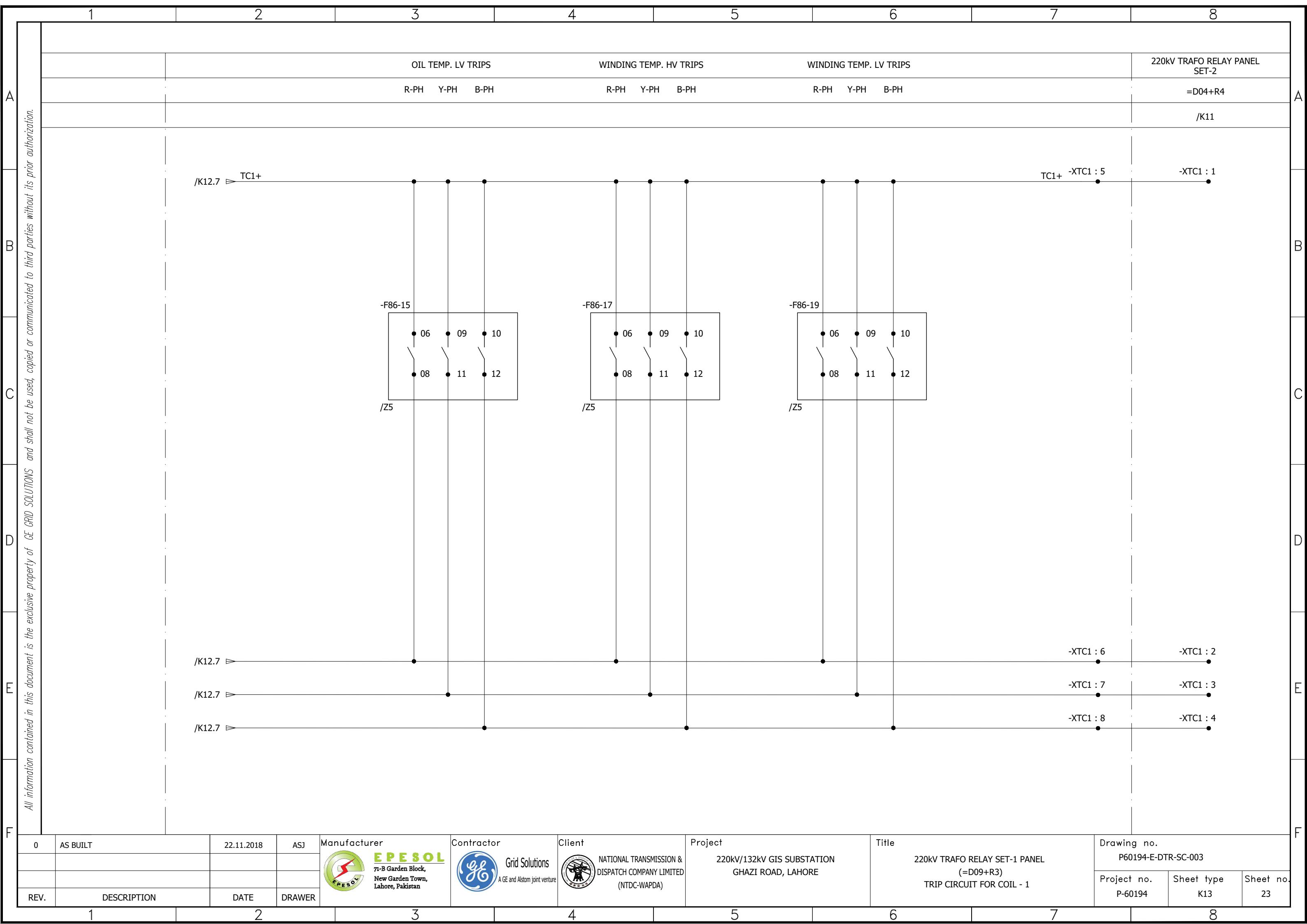
R-PH Y-PH B-PH



A
B
C
D
E
F

A
B
C
D
E
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) TRIP CIRCUIT FOR COIL - 1	Drawing no. P60194-E-DTR-SC-003
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type K12
1	2	3	4	5	6	7	8		Sheet no. 22



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HV OC/EF PROTECTION TRIPS

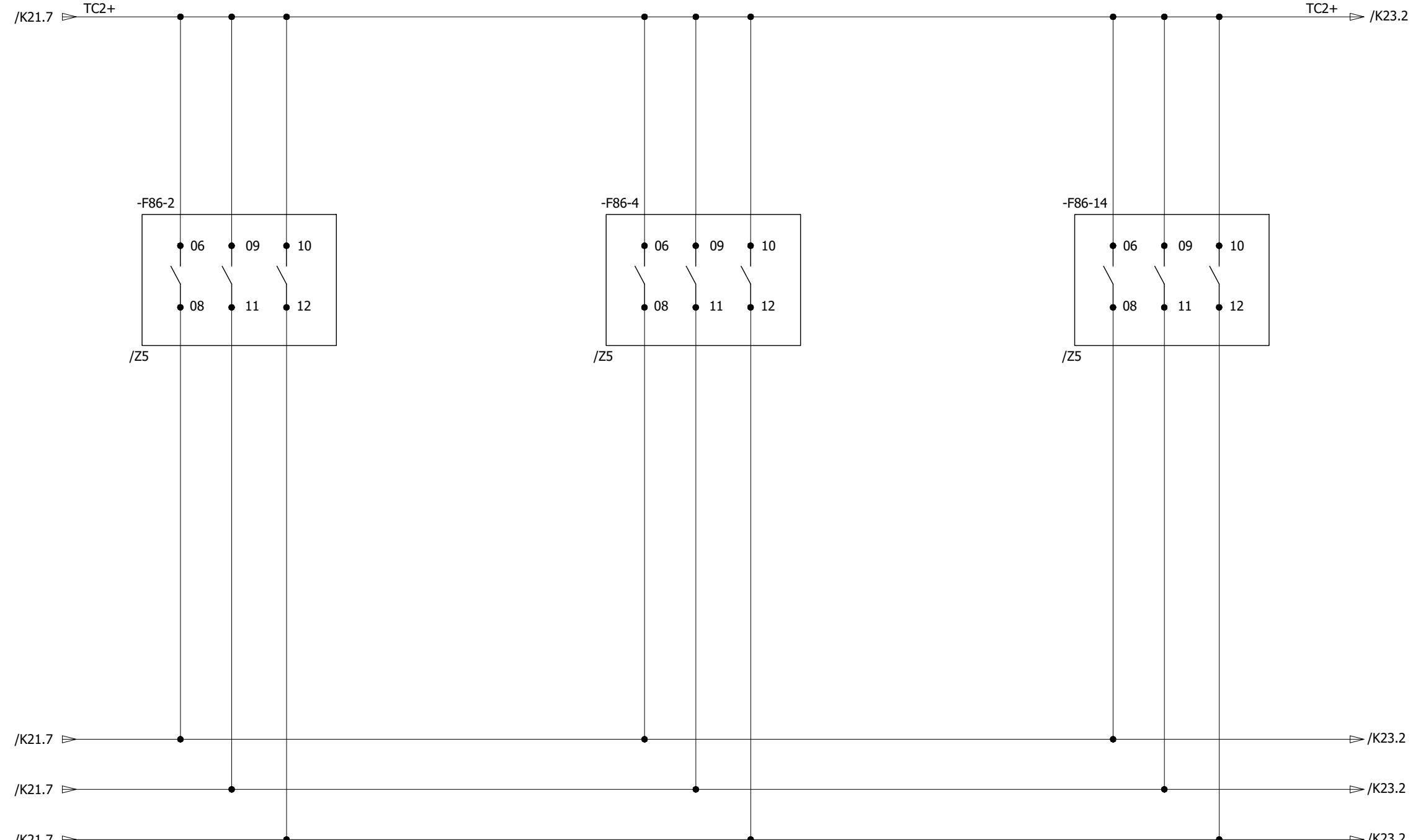
R-PH Y-PH B-PH

LV OC/EF PROTECTION TRIPS

R-PH Y-PH B-PH

OIL TEMP. HV TRIPS

R-PH Y-PH B-PH



A

A

B

B

C

C

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D

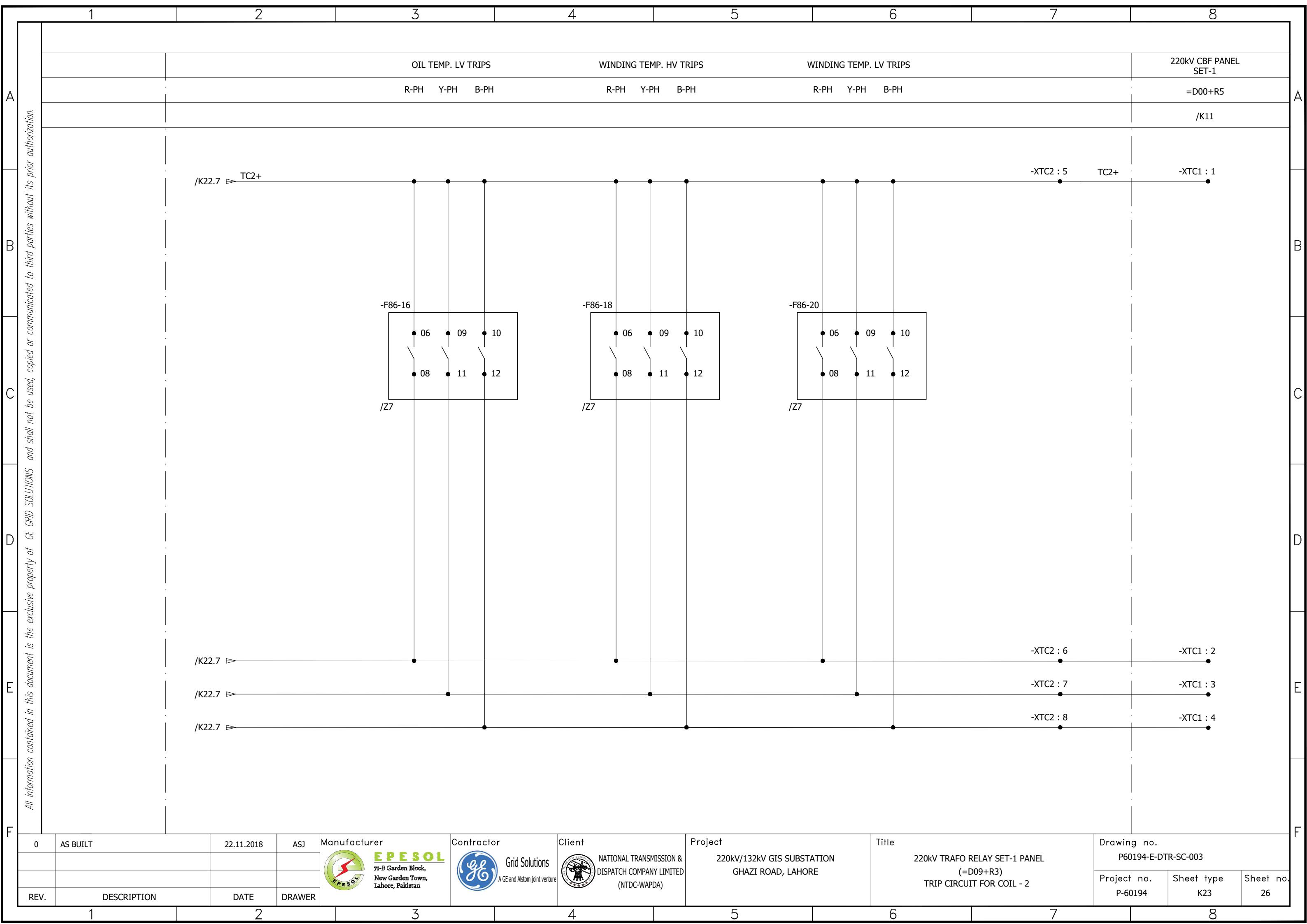
E

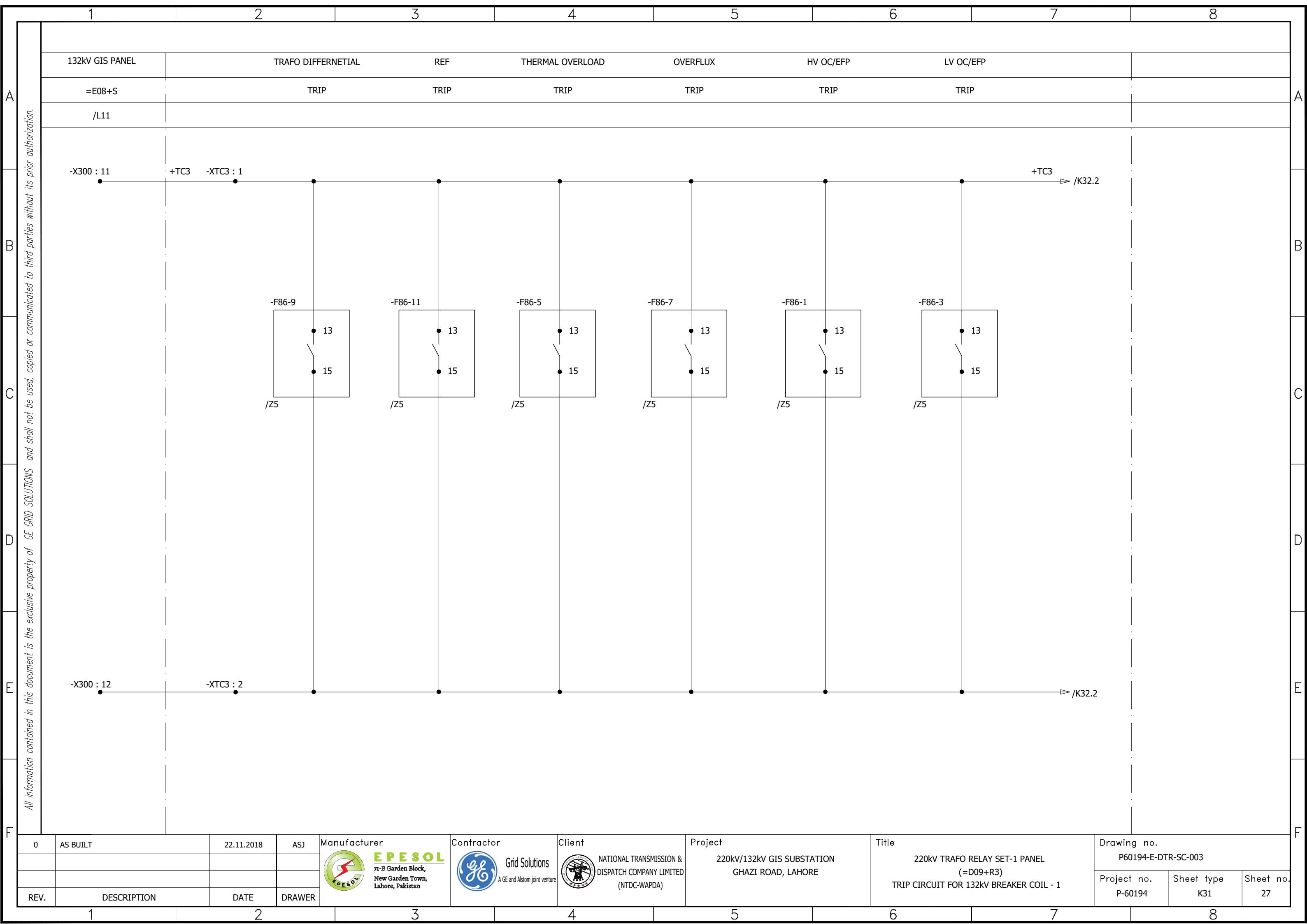
E

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 - 2	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K22
									Sheet no. 25





OIL TEMP. HV

OIL TEMP. LV

WINDING TEMP. HV

WINDING TEMP. LV

220KV TRAFO RELAY PANEL
SET-2

TRIP

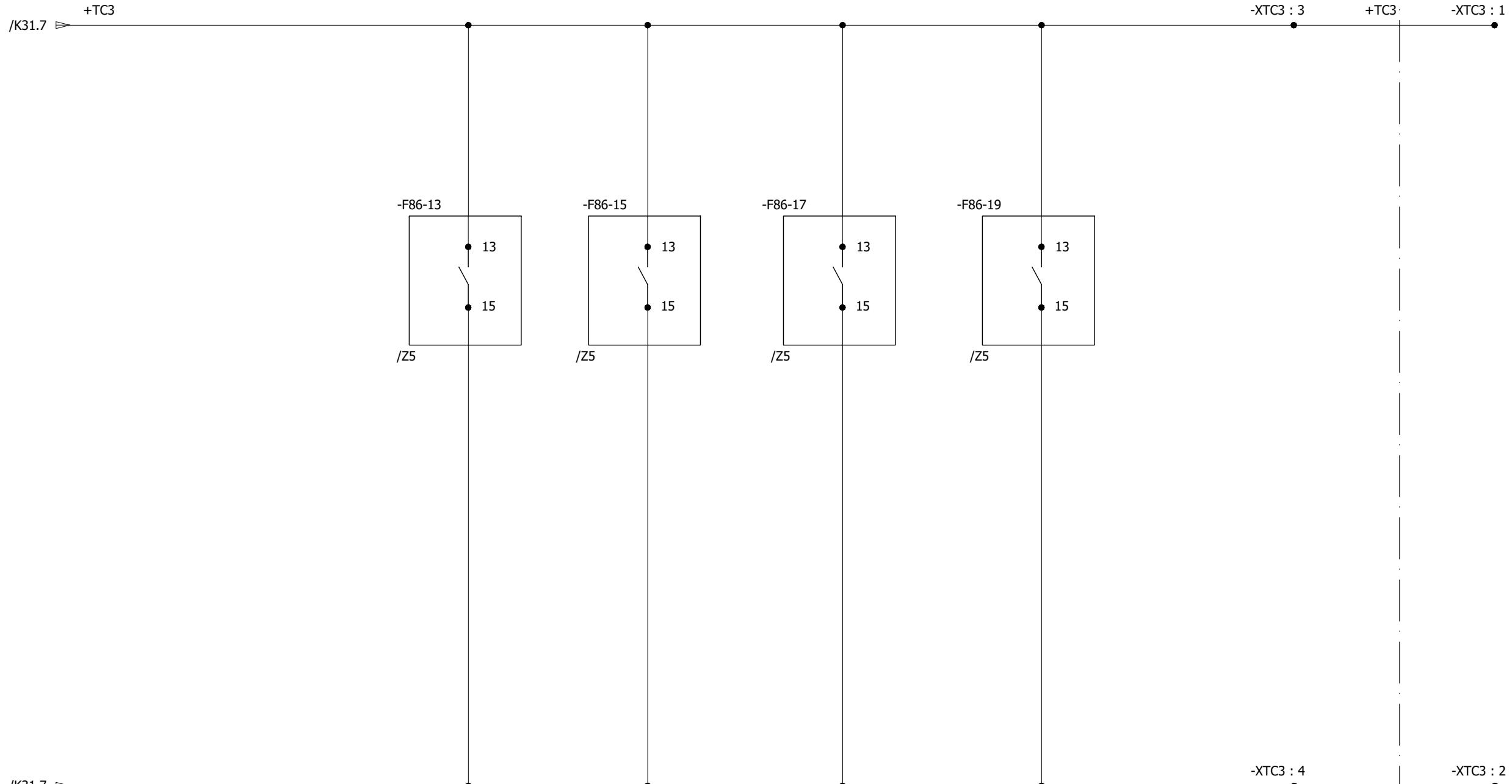
TRIP

TRIP

TRIP

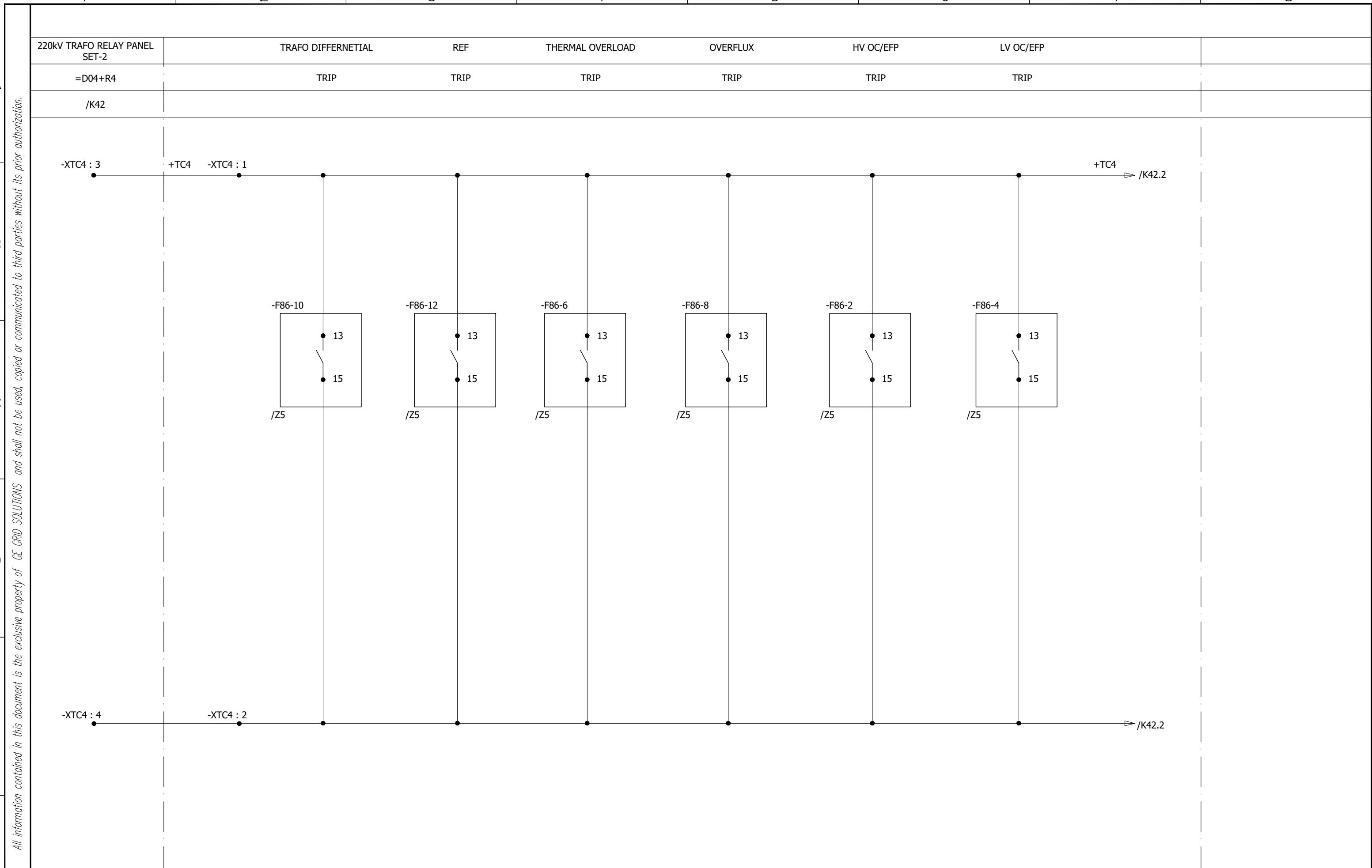
=D04+R4

/K31



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

OIL TEMP. HV

OIL TEMP. LV

WINDING TEMP. HV

WINDING TEMP. LV

220kV CBF PANEL
SET-1

TRIP

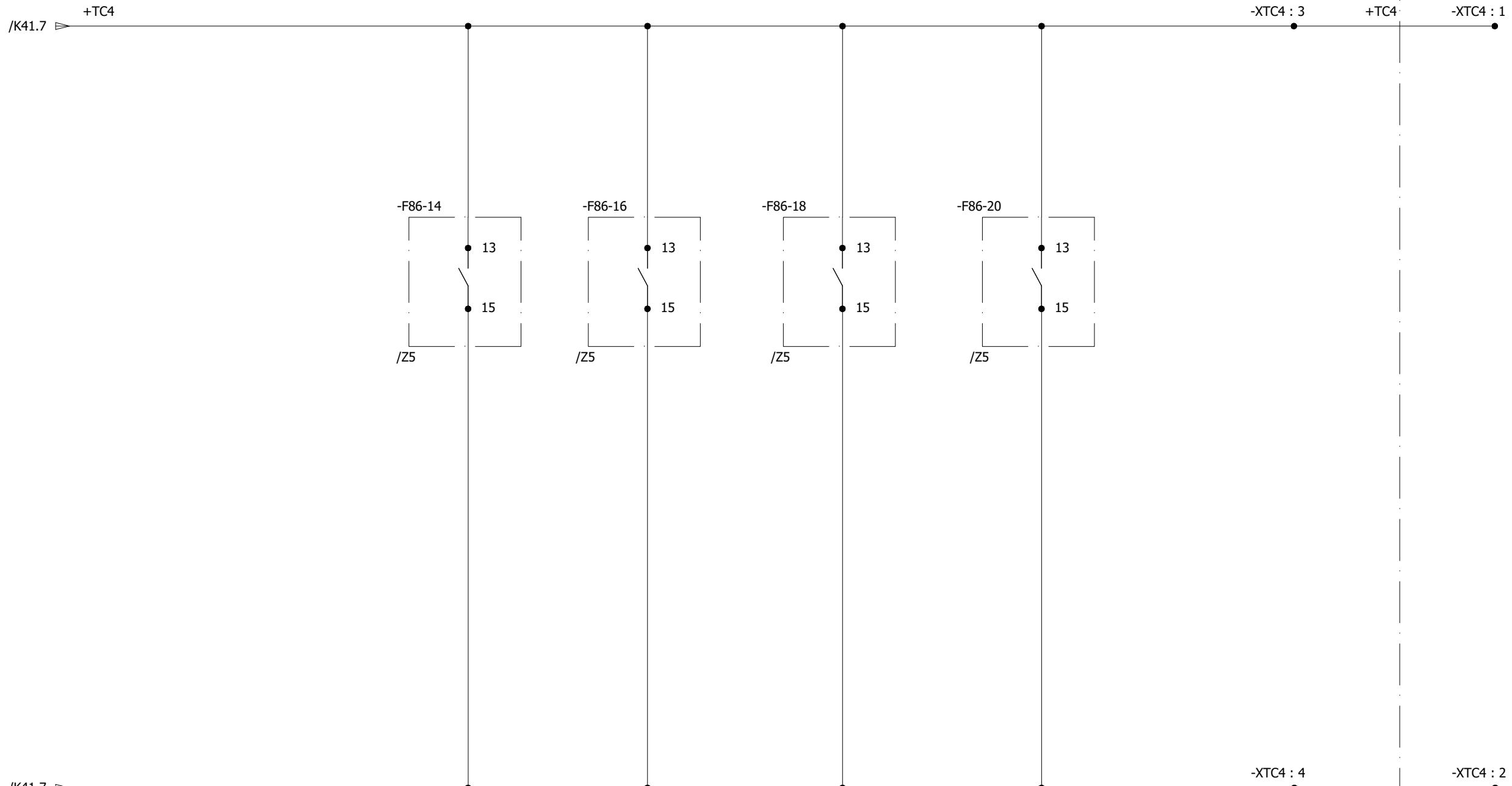
TRIP

TRIP

TRIP

=D00+R5

/Z



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A

A

B

B

C

C

D

D

E

E

F

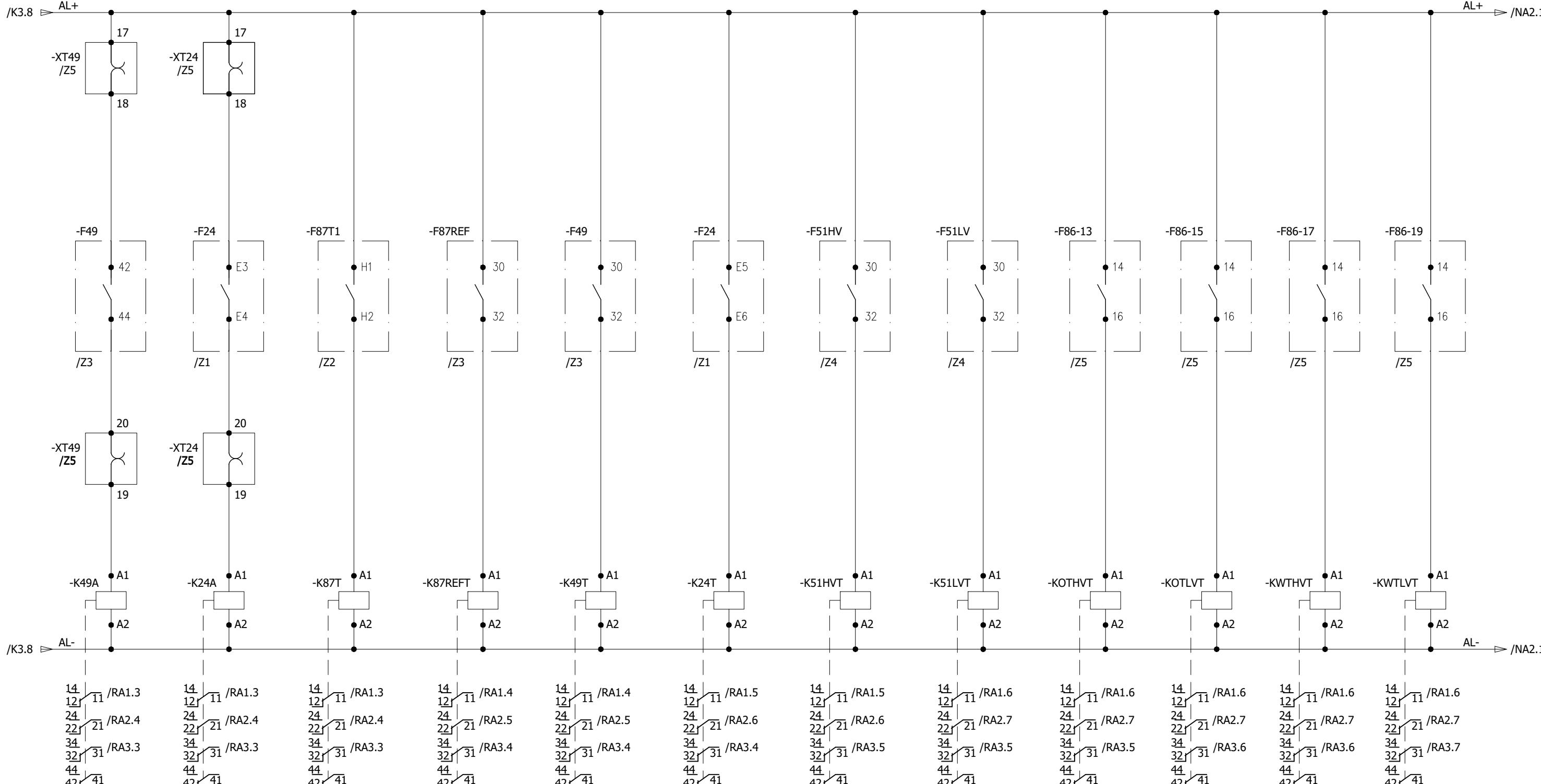
F

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 132kV BREAKER COIL - 2	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K42
									Sheet no. 30

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A

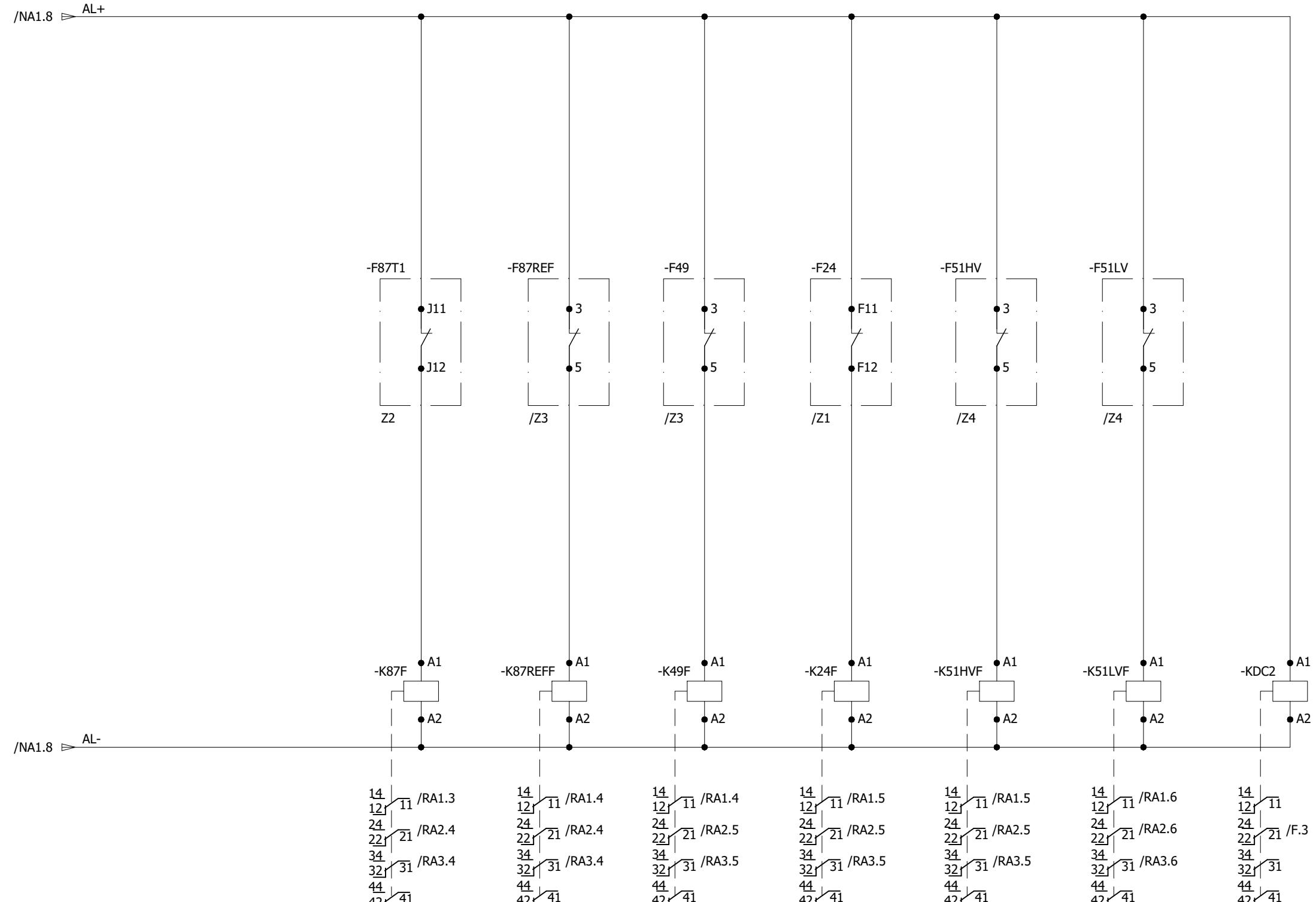
THERMAL OVERLOAD	OVERFLUX	TRAFO DIFFERENTIAL	REF	THERMAL O/L	OVEREXCITATION	HV OC/EF	LV OC/EF	OIL. TEMP HV	OIL. TEMP LV	WIND. TEMP HV	WIND. TEMP LV
ALARM	ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM	TRIP ALARM



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
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type NA1
									Sheet no. 31

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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

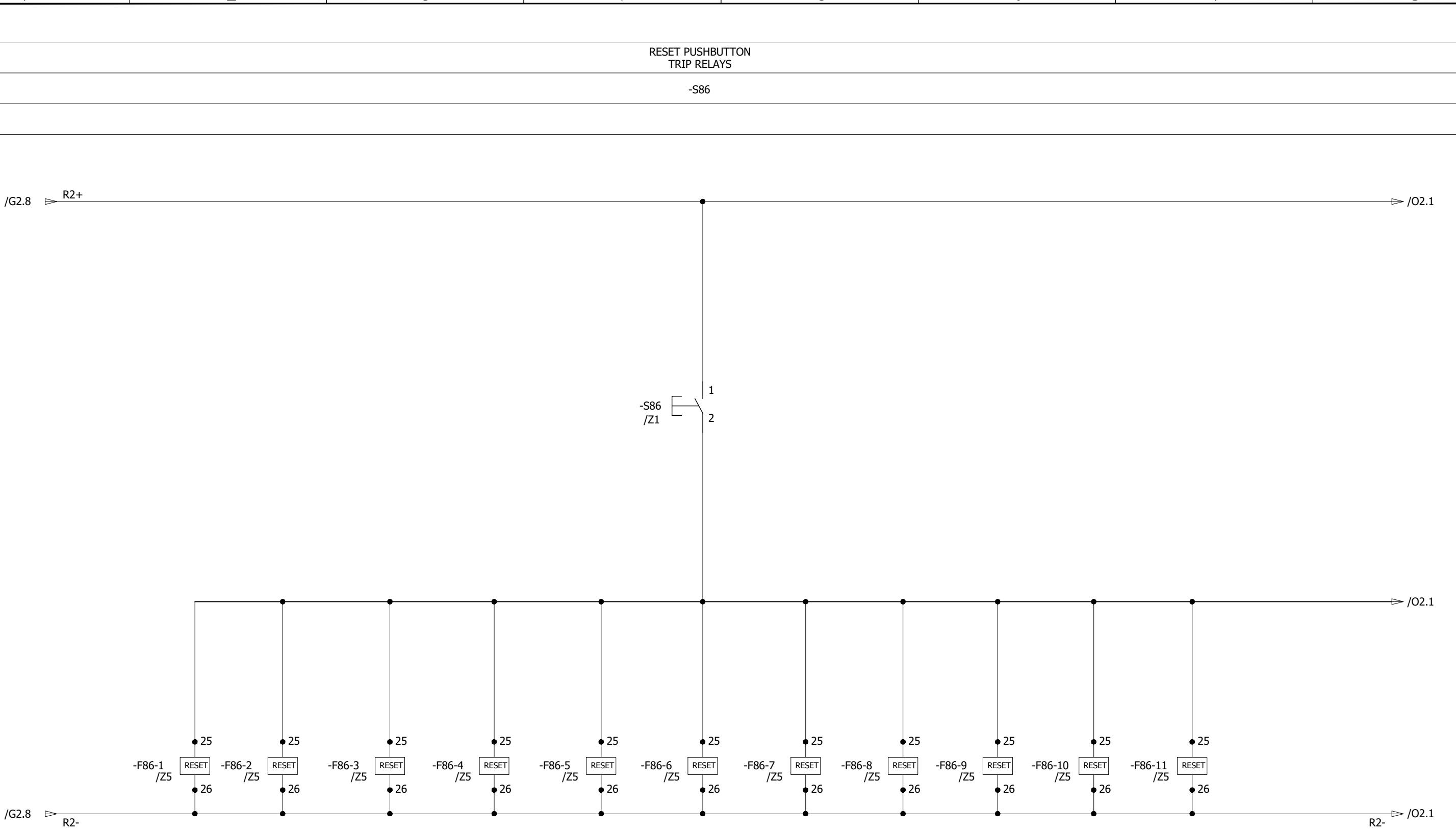


0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESEL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220KV TRAFO RELAY SET-1 PANEL (=D09+R3) SYSTEM ALARMS	Drawing no. P60194-E-DTR-SC-003
									Project no. P-60194
									Sheet type NA2
									Sheet no. 32

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RESET PUSHBUTTON
TRIP RELAYS

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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
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type O1
1	2	3	4	5	6	7	8		Sheet no. 33

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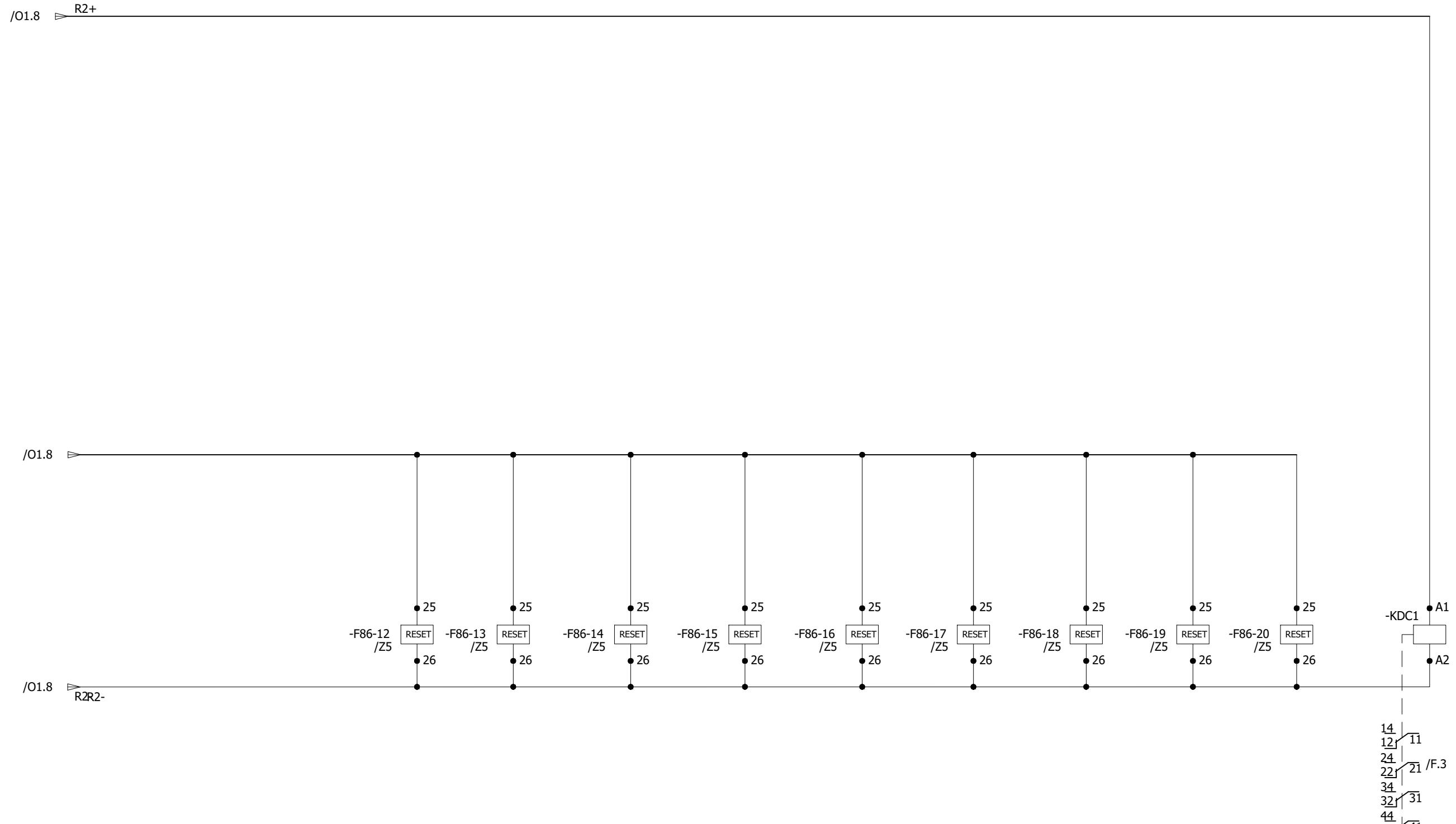
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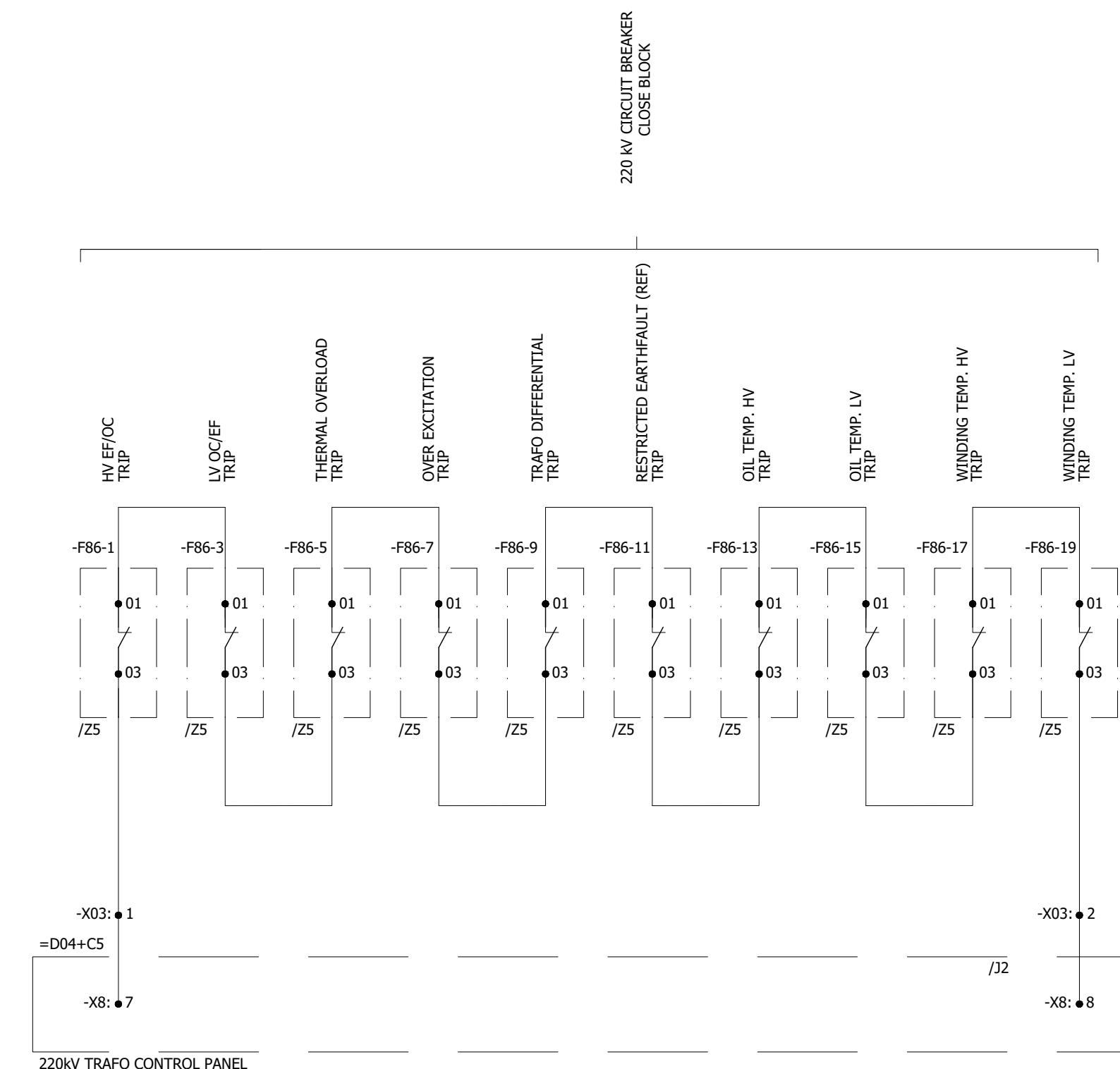
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type O2
									Sheet no. 34

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Manufacturer
E P E S O L
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

Project no. P-60194
Sheet type PA1
Sheet no. 35

0	AS BUILT	22.11.2018	ASJ	1
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REV.	DESCRIPTION	DATE	DRAWER	3

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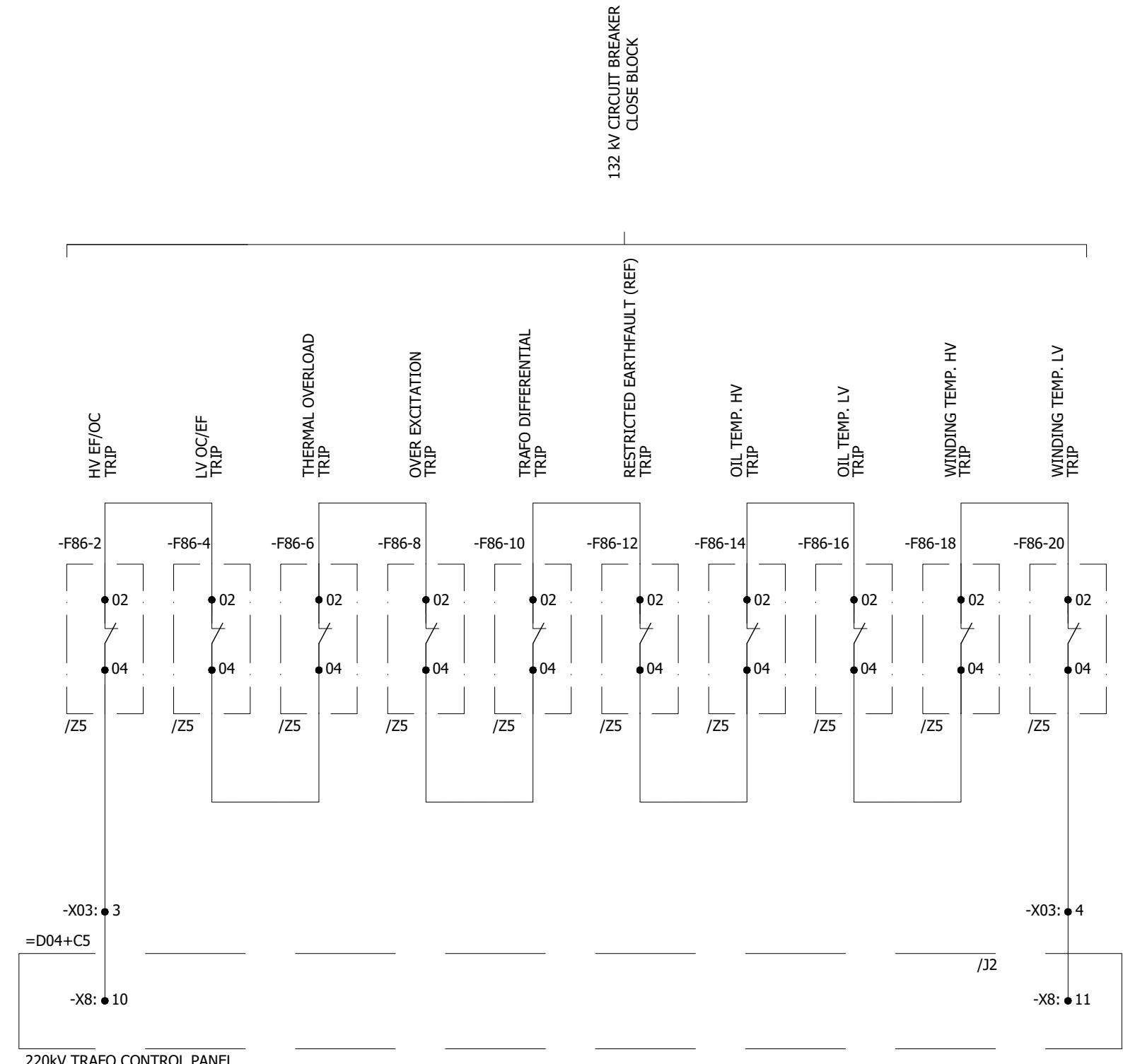
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS 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 PA2	Sheet no. 36
1	2	3	4						7	8	

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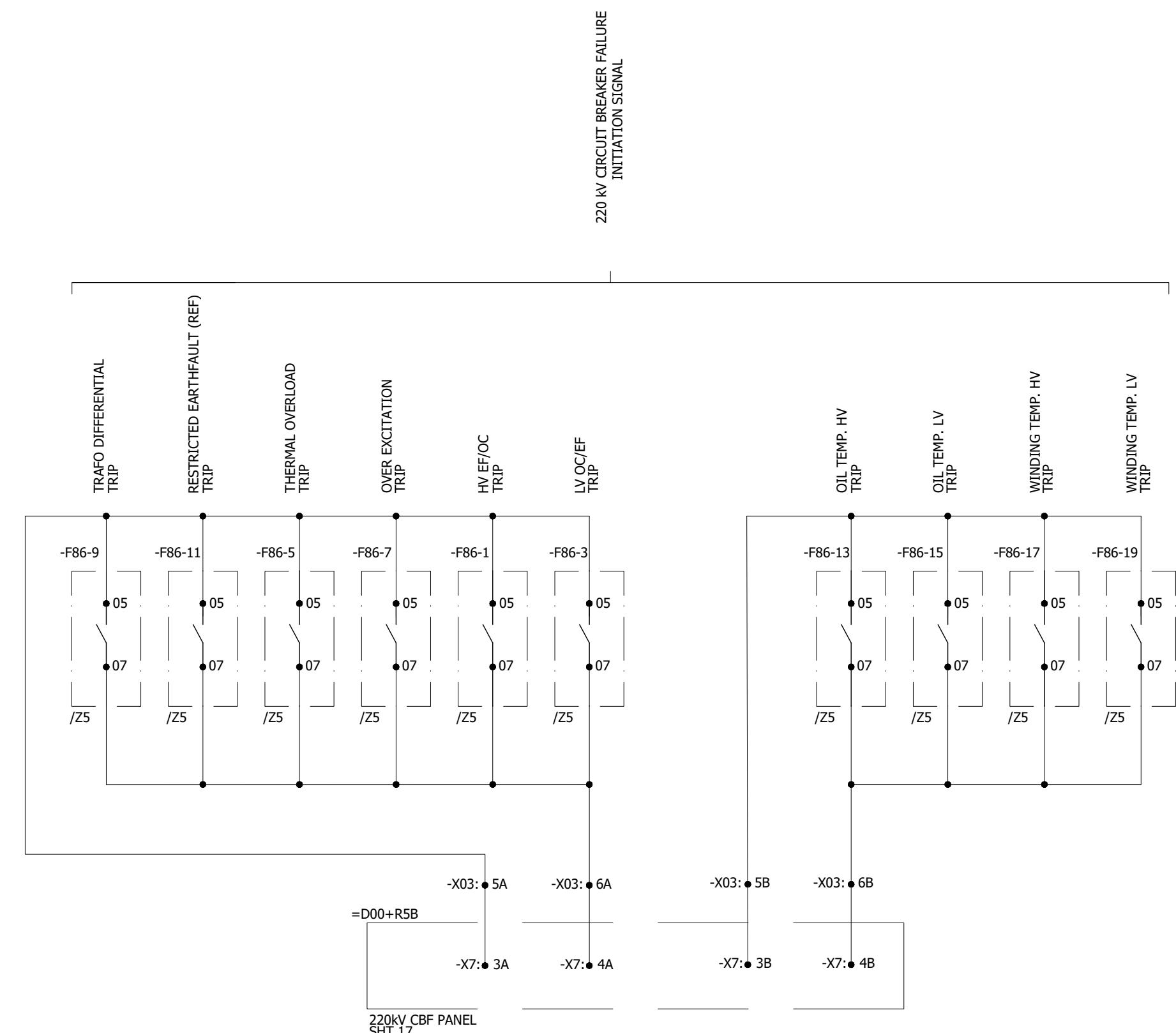
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0	AS BUILT		22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
REV.	DESCRIPTION		DATE	DRAWER	EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV TRAFO RELAY SET-1 PANEL (=D09+R3) PROTECTION INTER-CIRCUITS	P60194-E-DTR-SC-003		
										Project no. P-60194	Sheet type PA3	Sheet no. 37

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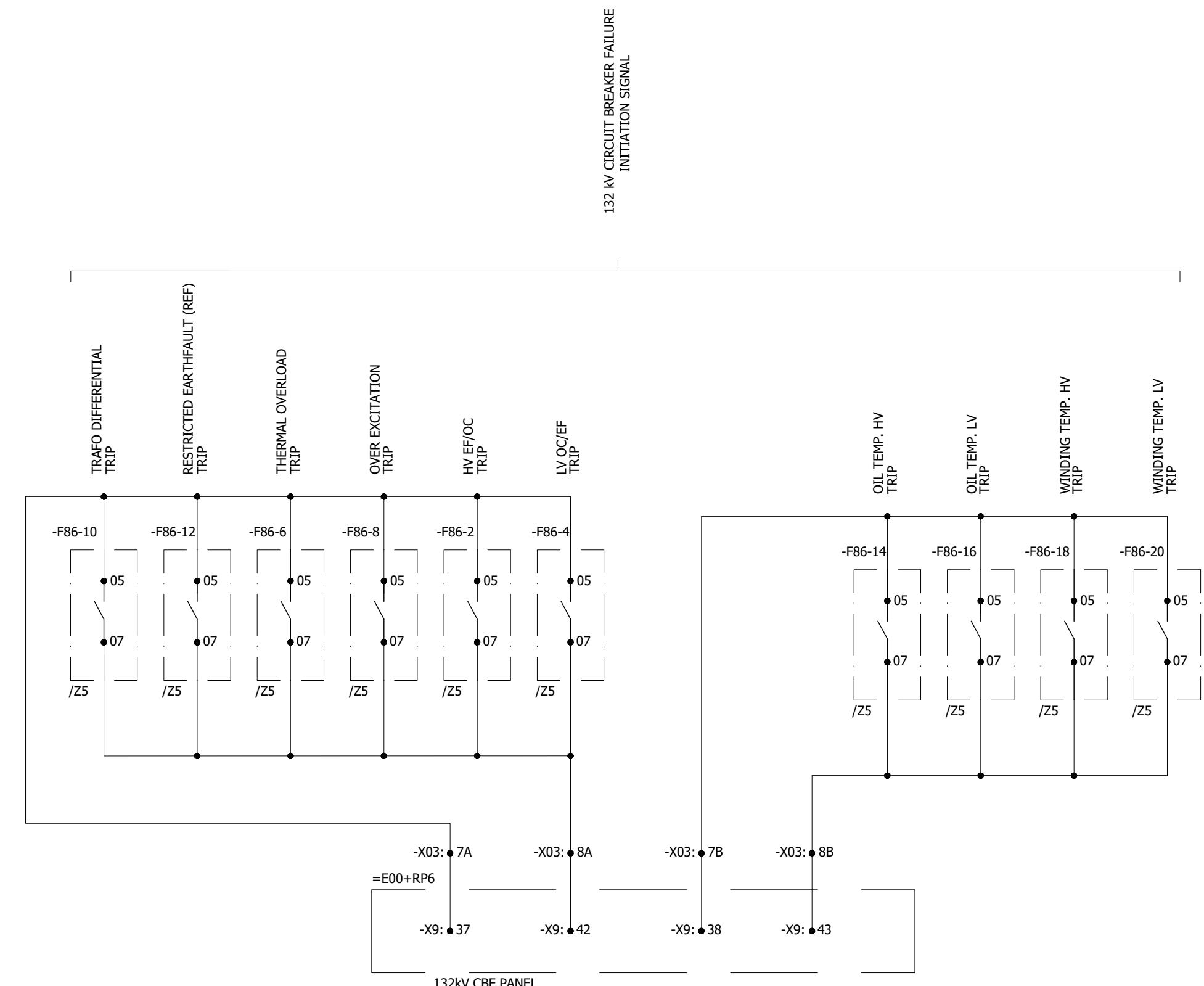
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS 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 PA4
									Sheet no. 38

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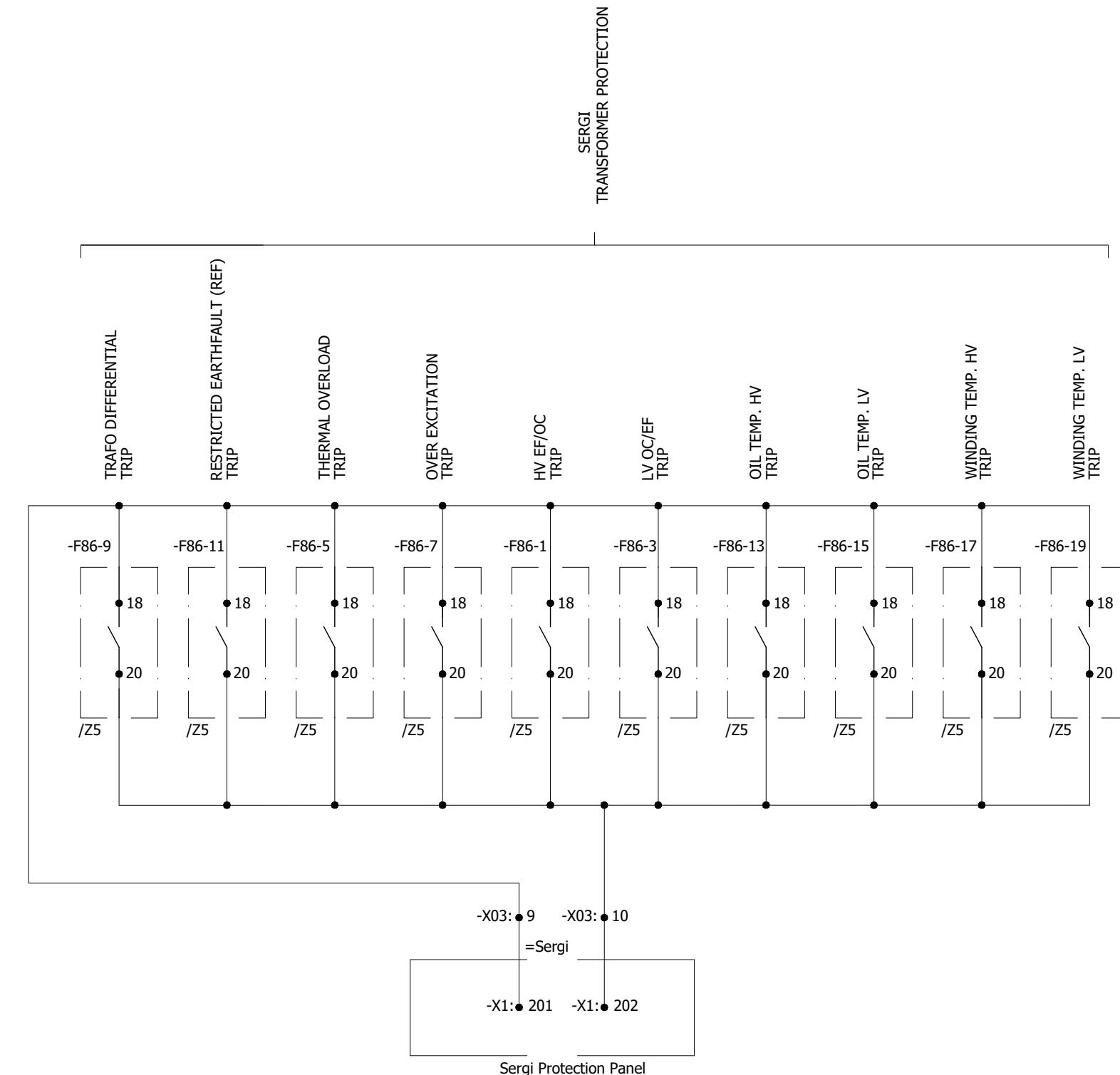
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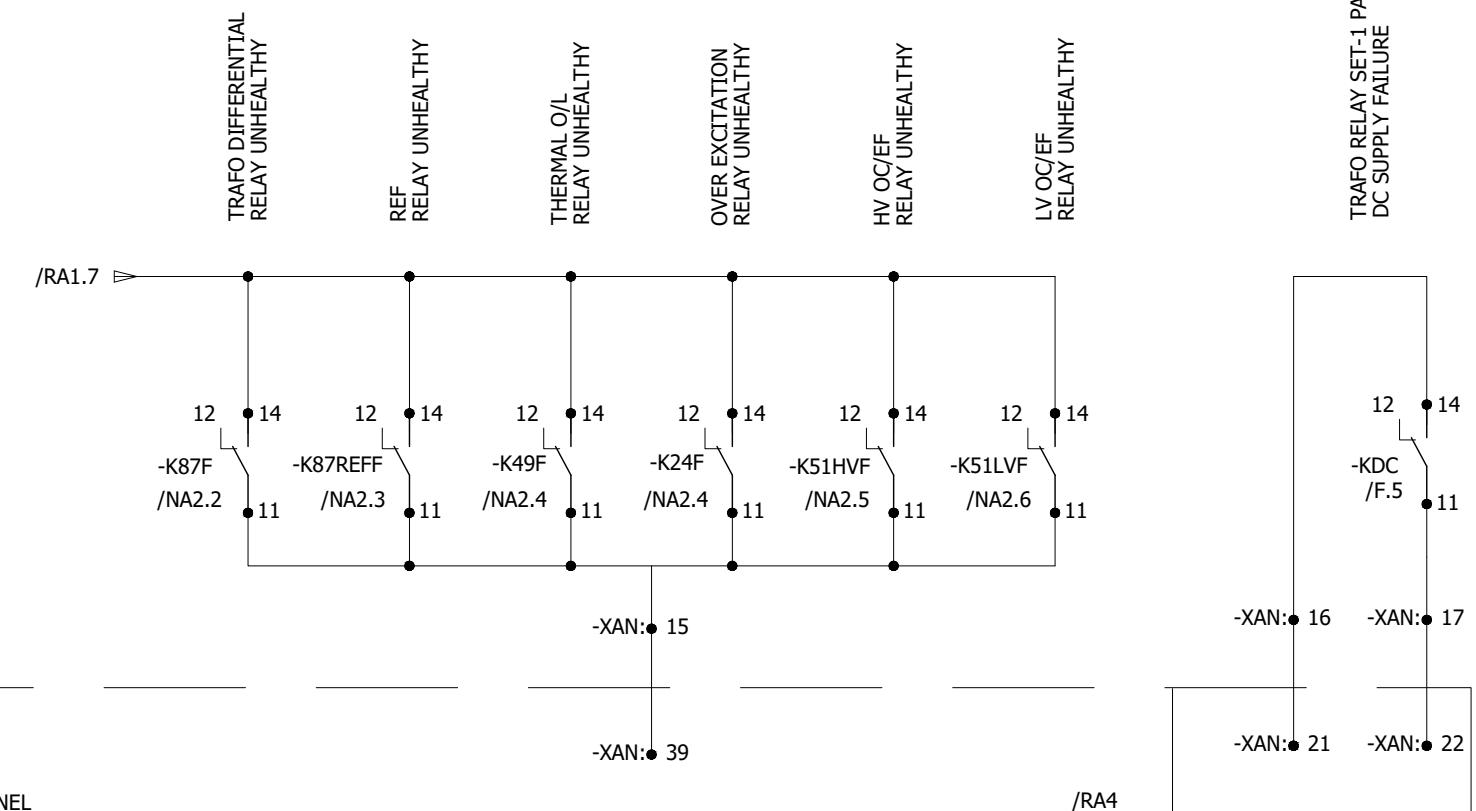
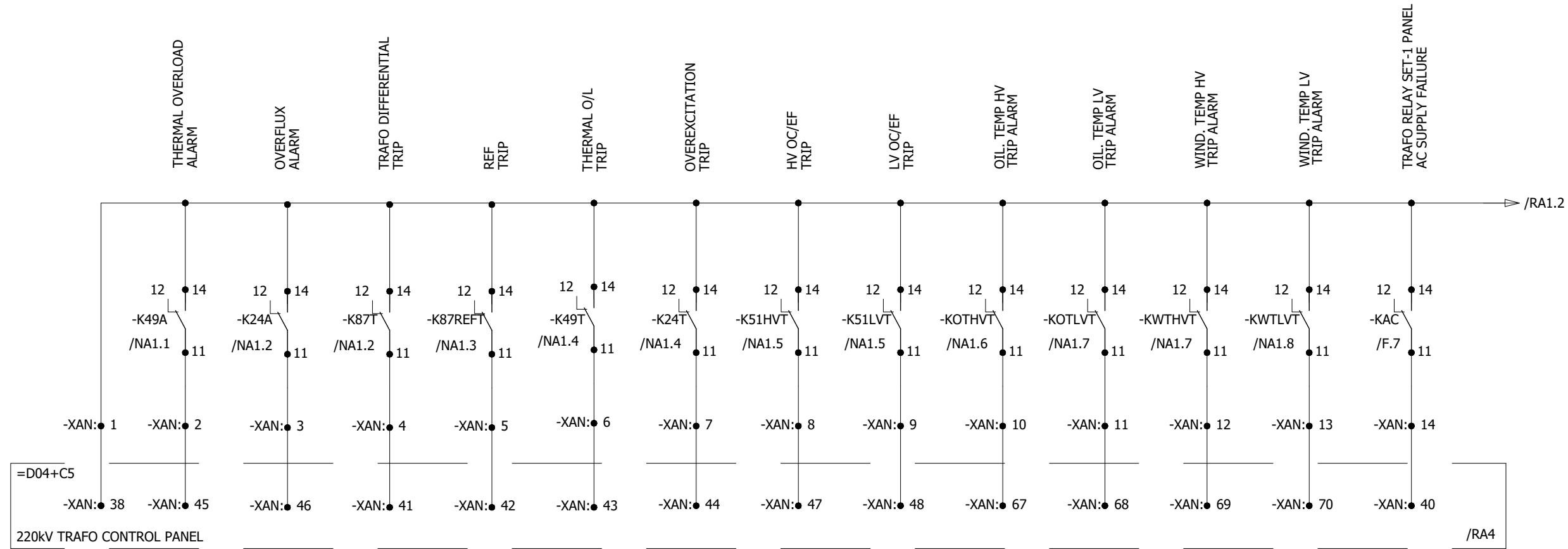
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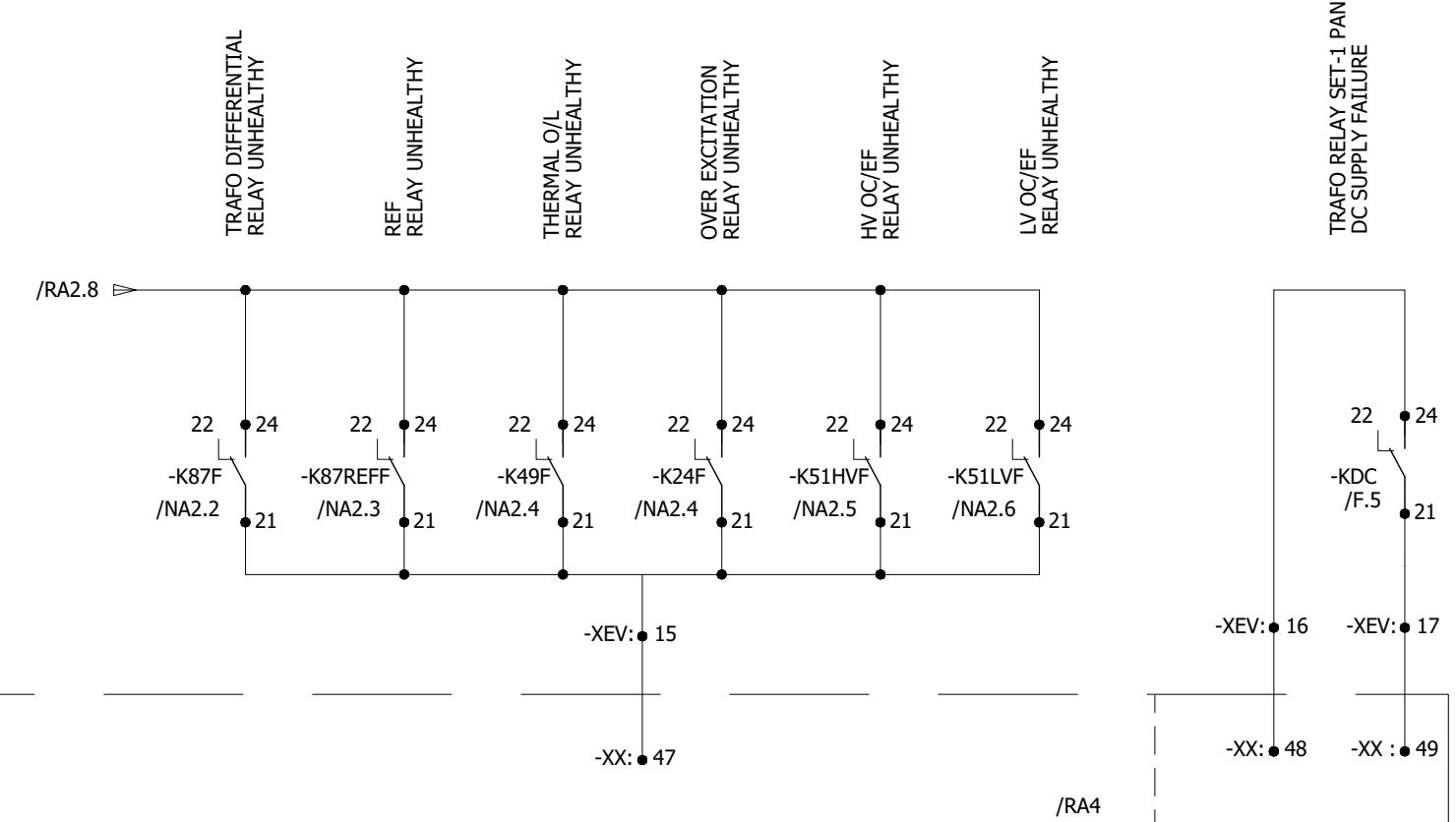
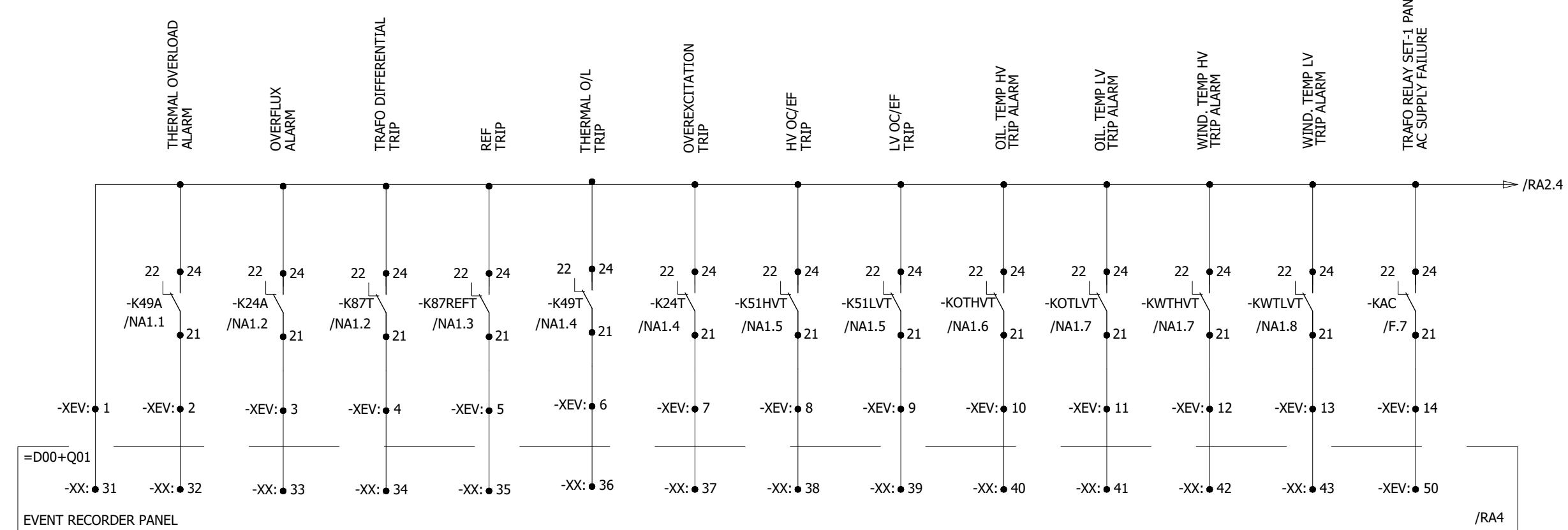
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type PA5 Sheet no. 39
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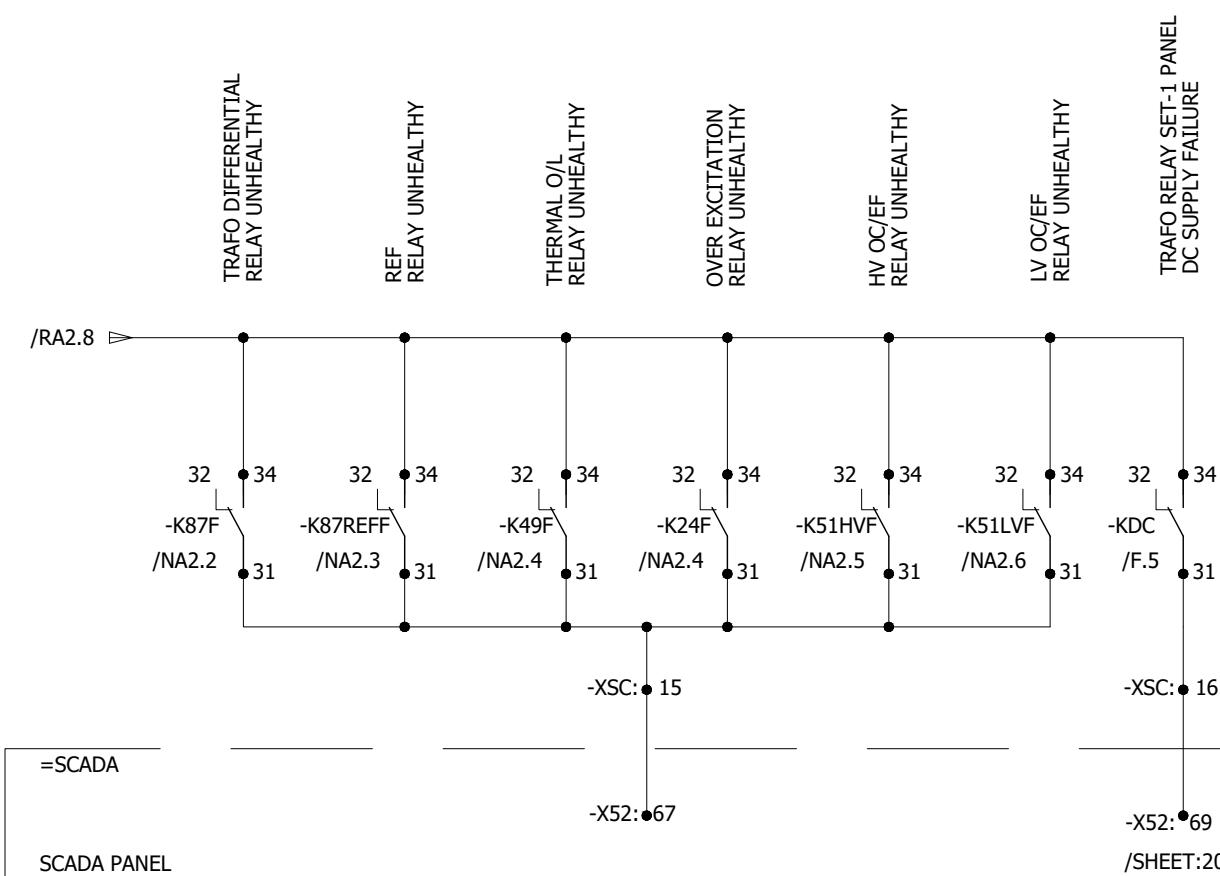
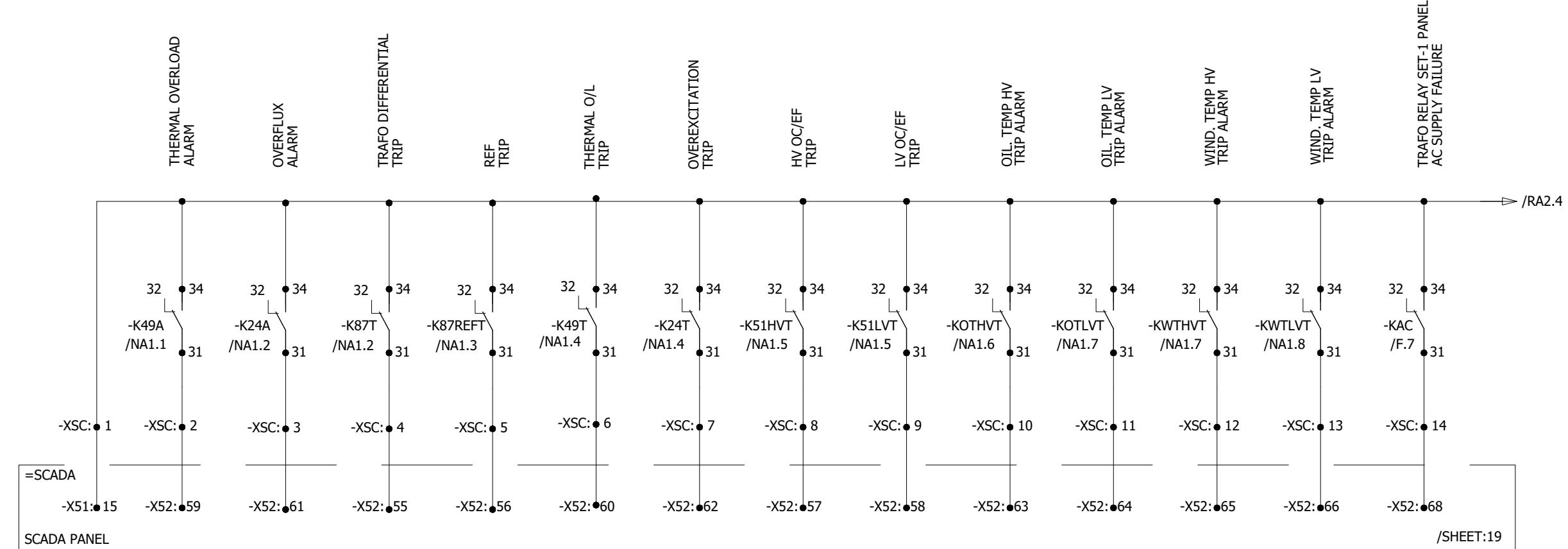
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA1	Sheet no. 40
1		2	3	4	5	6	7	8			

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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) 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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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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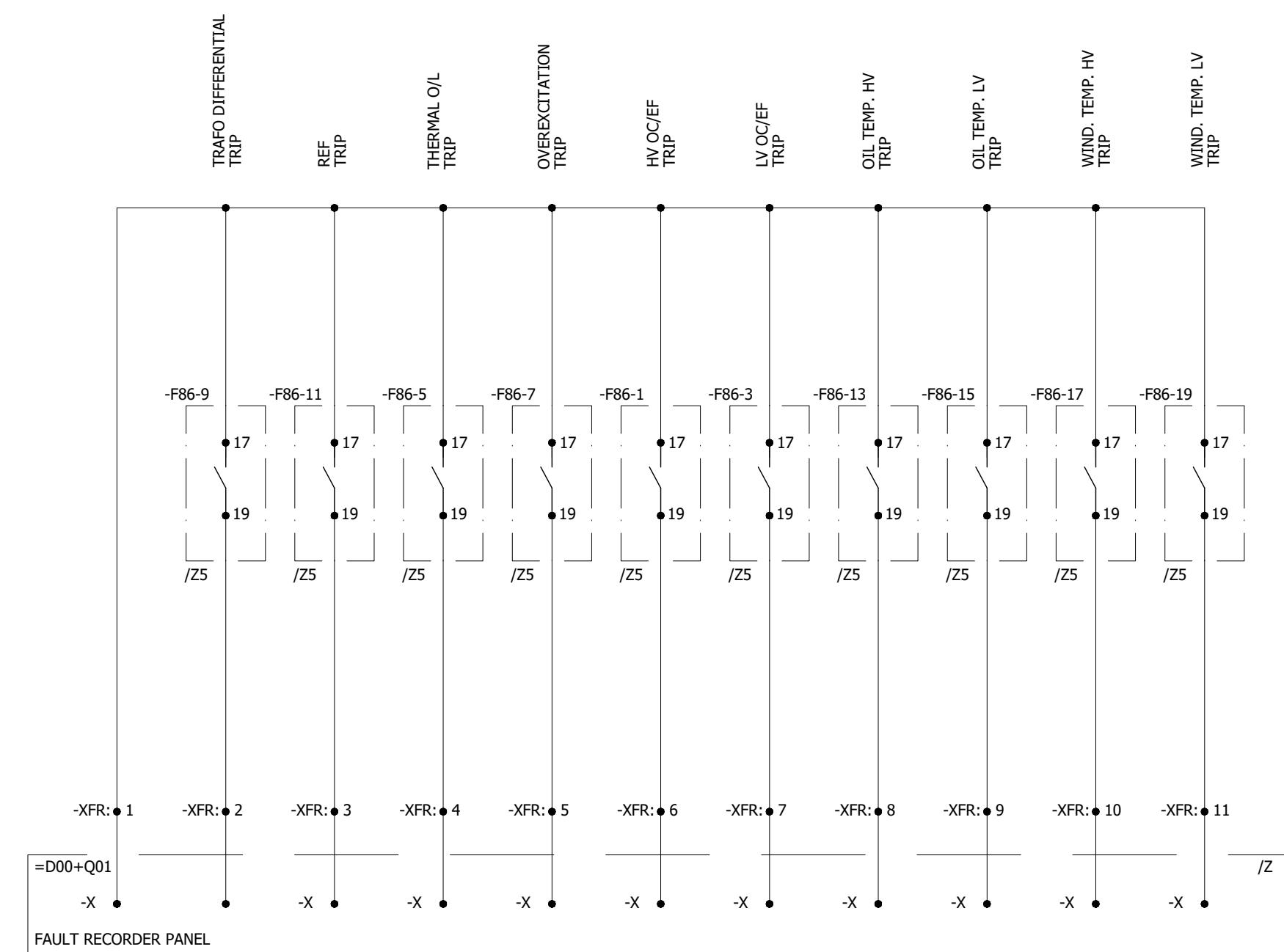
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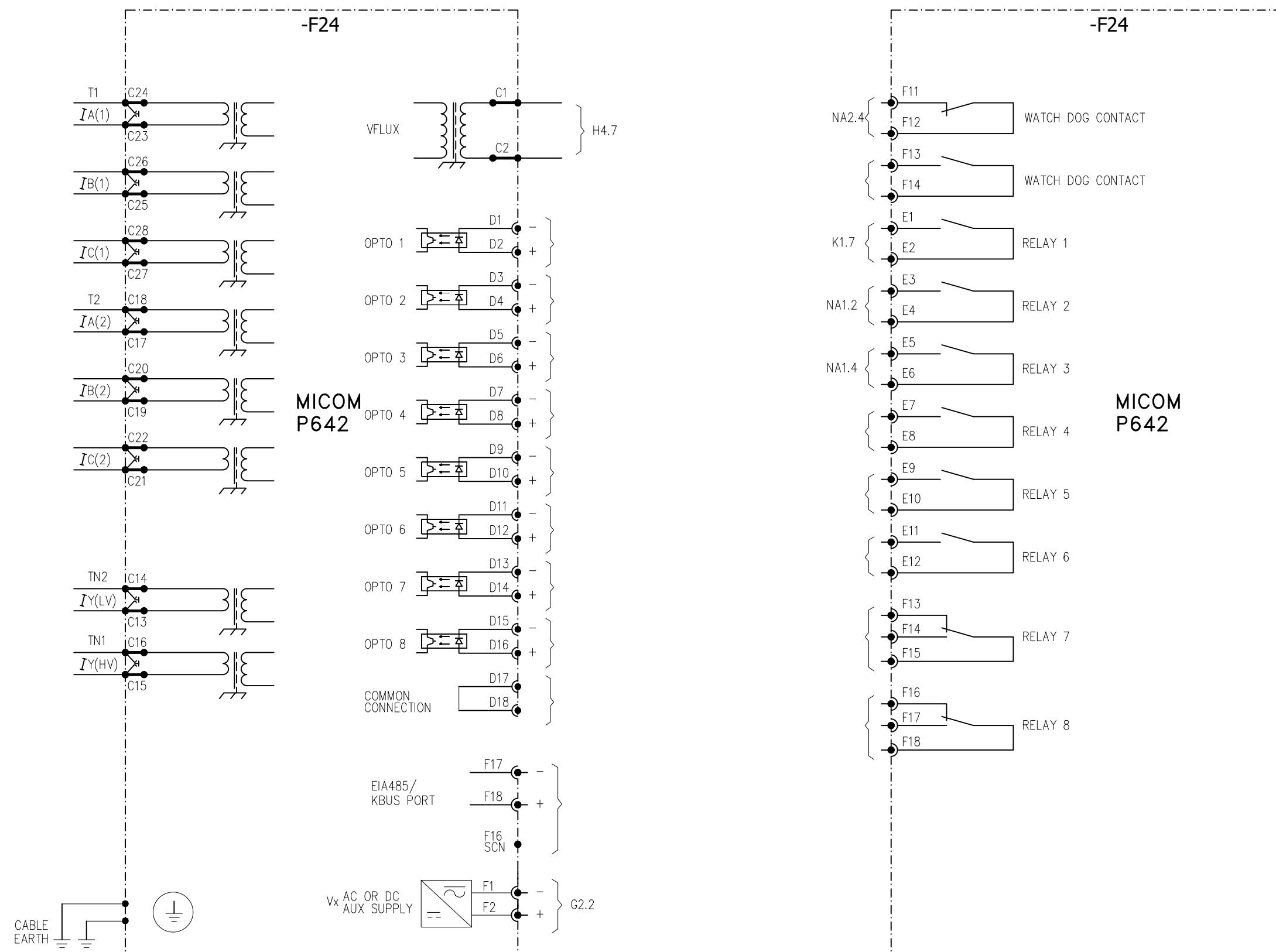
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV TRAFO RELAY SET-1 PANEL (=D09+R3) FAULT RECORDER CIRCUIT	Drawing no. P60194-E-DTR-SC-003
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type RA4
									Sheet no. 43

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0	AS BUILT	22.11.2018	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 GAZI ROAD, LAHORE	220kV TRAFO RELAY SET-1 PANEL (=D09+R3) COMPONENT DIAGRAM	P60194-E-DTR-SC-003
									Project no. P-60194
									Sheet type Z1
									Sheet no. 44

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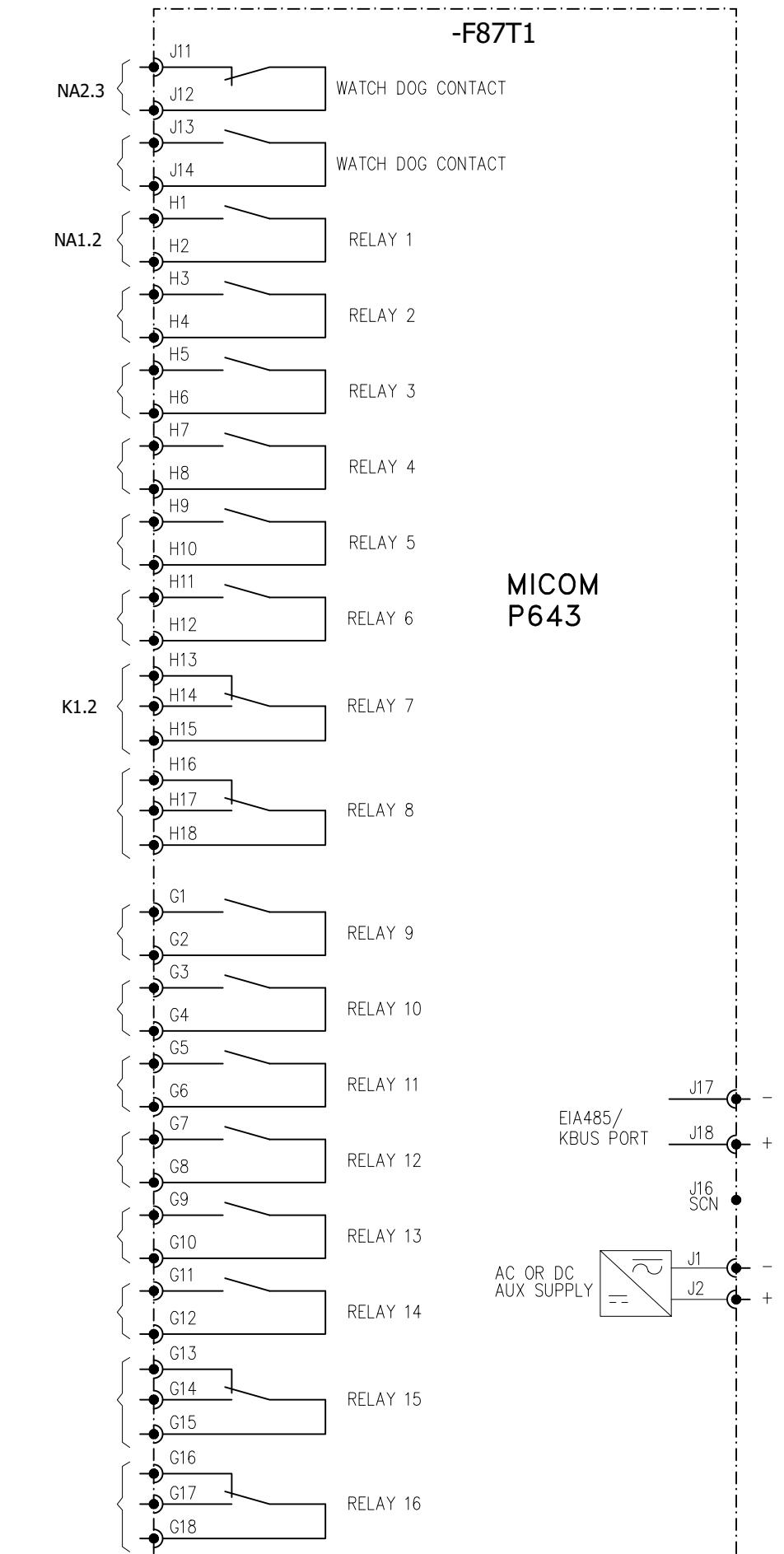
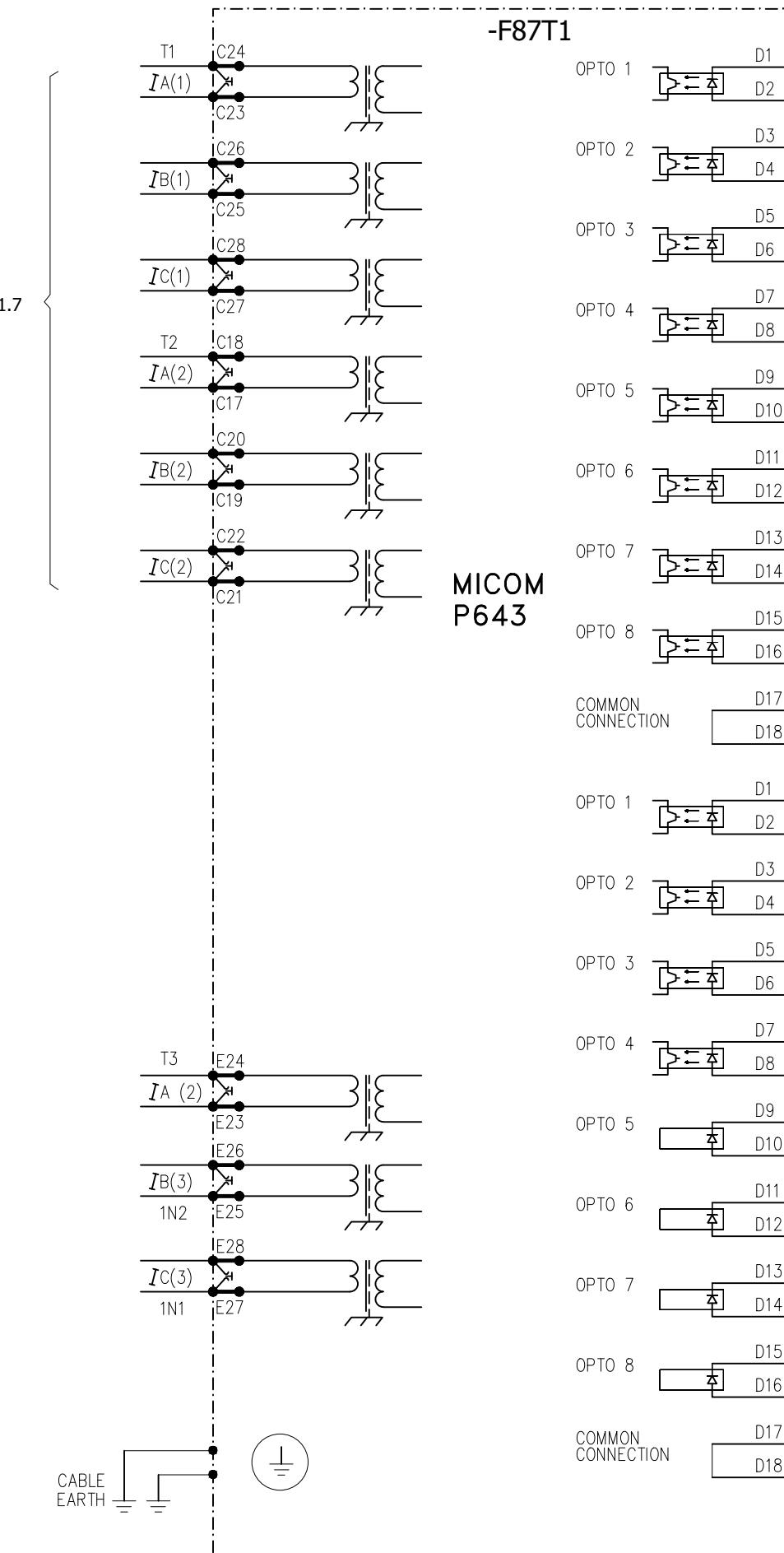
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0	AS BUILT	22.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GAZI ROAD, LAHORE	Title 220KV TRAFO RELAY SET-1 PANEL (=D09+R3) COMPONENT DIAGRAM	Drawing no. P60194-E-DTR-SC-003		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z2	Sheet no. 45
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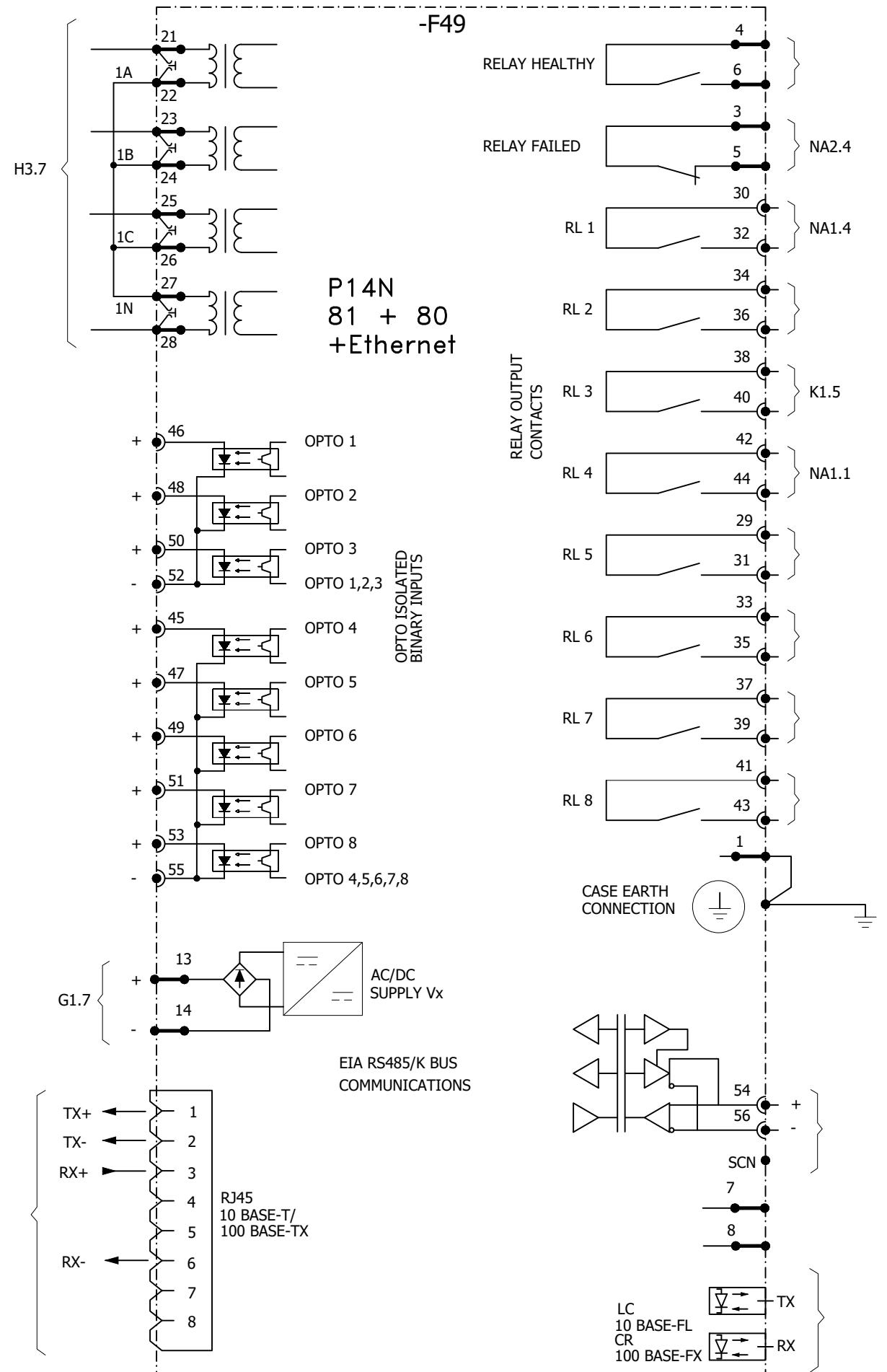
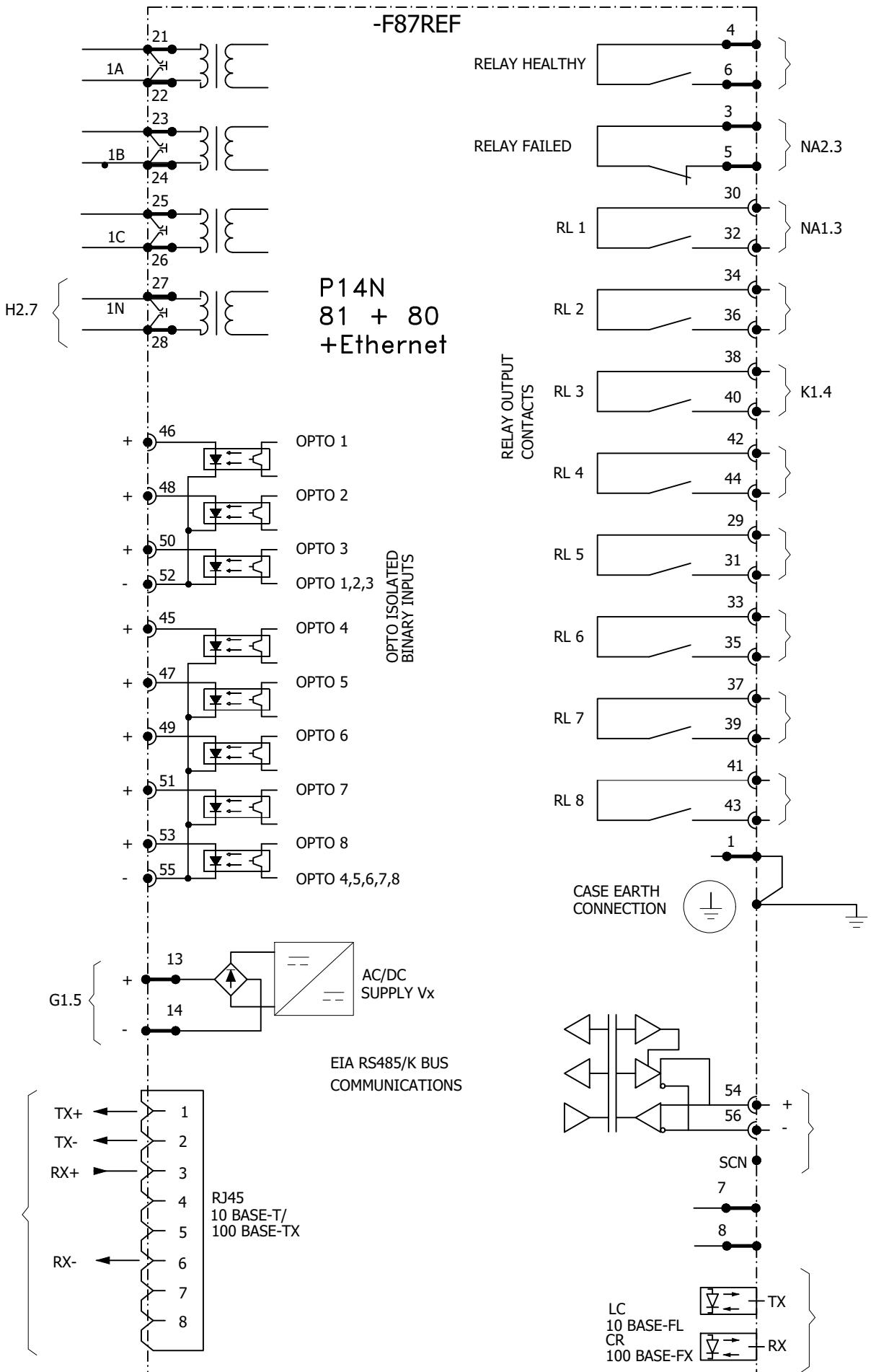
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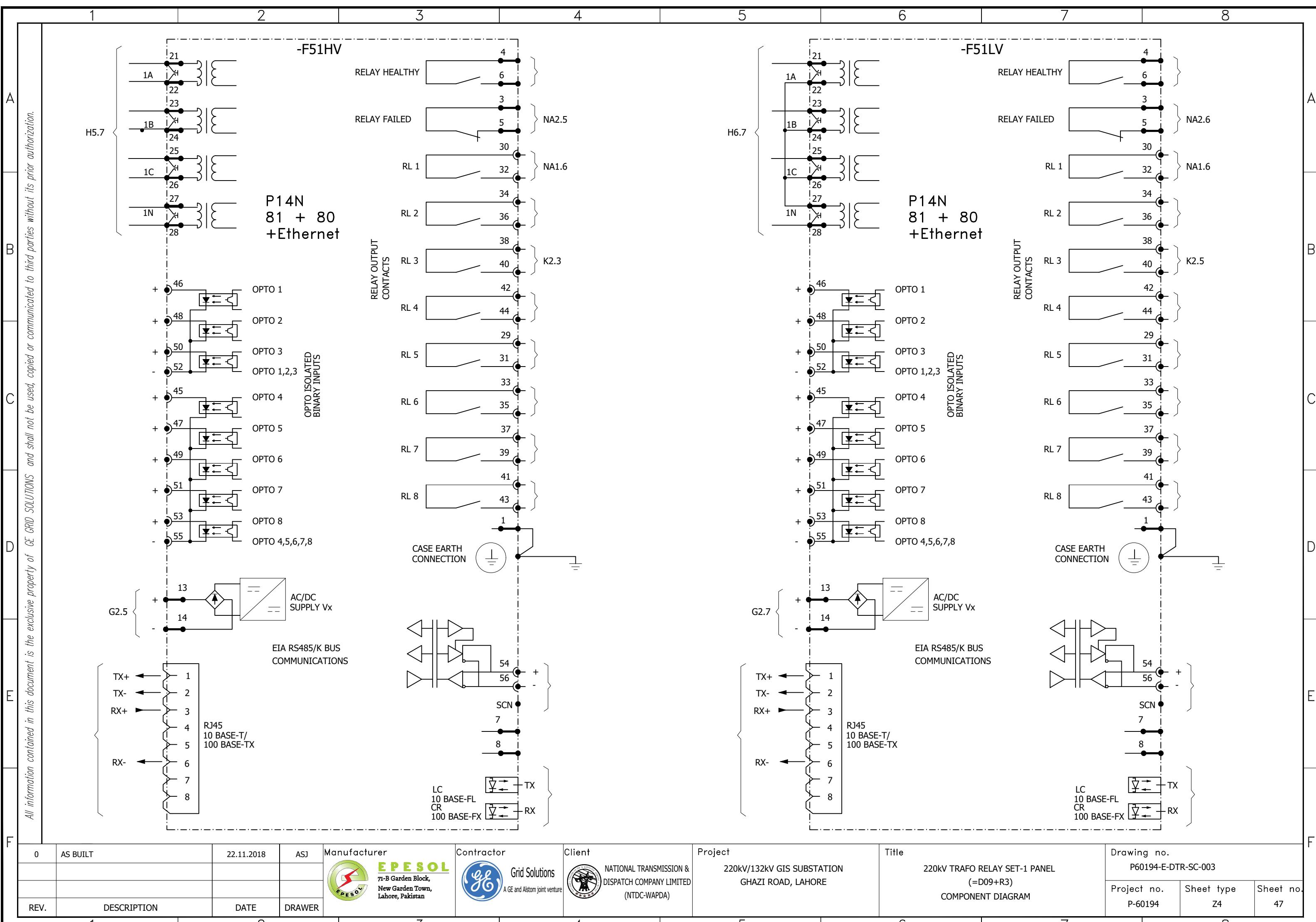
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0	AS BUILT	22.11.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	220KV TRAFO RELAY SET-1 PANEL (=D09+R3) COMPONENT DIAGRAM	P60194-E-DTR-SC-003
									Project no. P-60194 Sheet type Z3 Sheet no. 46



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-XT87T	H1.5	K1.2	G1.2			H1.5	
-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	

-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			
-F86-11	K1.4	O1.3	PA1.3		PA3.3	K11	K11	K11	K31		RA4.3	PA5.3
-F86-12	K1.4	O1.3		PA2.3	PA4.3	K21	K21	K21	K41			
-F86-5	K1.5	O1.4	PA1.4		PA3.4	K11	K11	K11	K31		RA4.4	PA5.4
-F86-6	K1.6	O1.4		PA2.4	PA4.4	K21	K21	K21	K41			
-F86-7	K1.7	O1.5	PA1.4		PA3.4	K11	K11	K11	K31		RA4.4	PA5.4
-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			
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-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			
-F86-15	K3.4	O2.3	PA1.5		PA3.5	K13	K13	K13	K32	NA1.7	RA4.5	PA5.5
-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  71-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 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									
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