



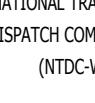
# Grid Solutions

A GE and Alstom joint venture

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

# 220kV SYNCHRONIZING PANEL (=D00+C6)

## SCHEMATIC DRAWINGS

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	0	AS BUILT	18.08.2018	MSC	Manufacturer  EPESOL 7-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 SYNCHRONIZING PANEL (=D00+C6) LIST OF CONTENTS	Drawing no. P60194-E-DSC-SC-001					
	REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type AA	Sheet no. 02			

	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A		CIRCUIT BREAKER		MINIATURE CIRCUIT BREAKER		AUXILIARY CONTACTOR NO+NC	21	DISTANCE
B		SWITCH/ISOLATOR		KEY OPERATED SELECTOR SWITCH		AMMETER	24	OVEREXCITATION
C		EARTHING		LIMITED SWITCH		VOLTMETER	25	SYNCHROCHECK
D		SF6 TO AIR BUSHING		HUMIDITY & TEMPERATURE CONTROLLER		POWER FACTOR METER	49	THERMAL OVERLOAD
E		LINE TRAP		PANEL HEATER		DIGITAL PANEL METER	50/51	PHASE INST./OVERCURRENT
F		SURGE ARRESTOR		THREE PIN SOCKET		ACTIVE POWER METER	50N/51N	EARTH INST./OVERCURRENT
G		CURRENT TRANSFORMER		INDICATION LIGHT		REACTIVE POWER METER	50BF	CIRCUIT BREAKER FAILURE
H		COUPLING CAPACITOR VOLTAGE TRANSFORMER		PUSH BUTTON		ENERGY METER	64	RESTRICTED EARTH FAULT
I		POWER TRANSFORMER		AUXILIARY CONTACTOR COIL			67N	DIRECTIONAL EARTH FAULT
J		AUTO TRANSFORMER		POWER SUPPLY AC/DC			68	POWER SWING BLOCKING
K				TERMINAL			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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1 AS BUILT 18.08.2018 MSC Manufacturer EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan

Contractor Grid Solutions A GE and Alstom joint venture

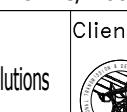
Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)

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

Title 220kV SYNCHRONIZING PANEL (=D00+C6) SYMBOLA AND LEGENDS

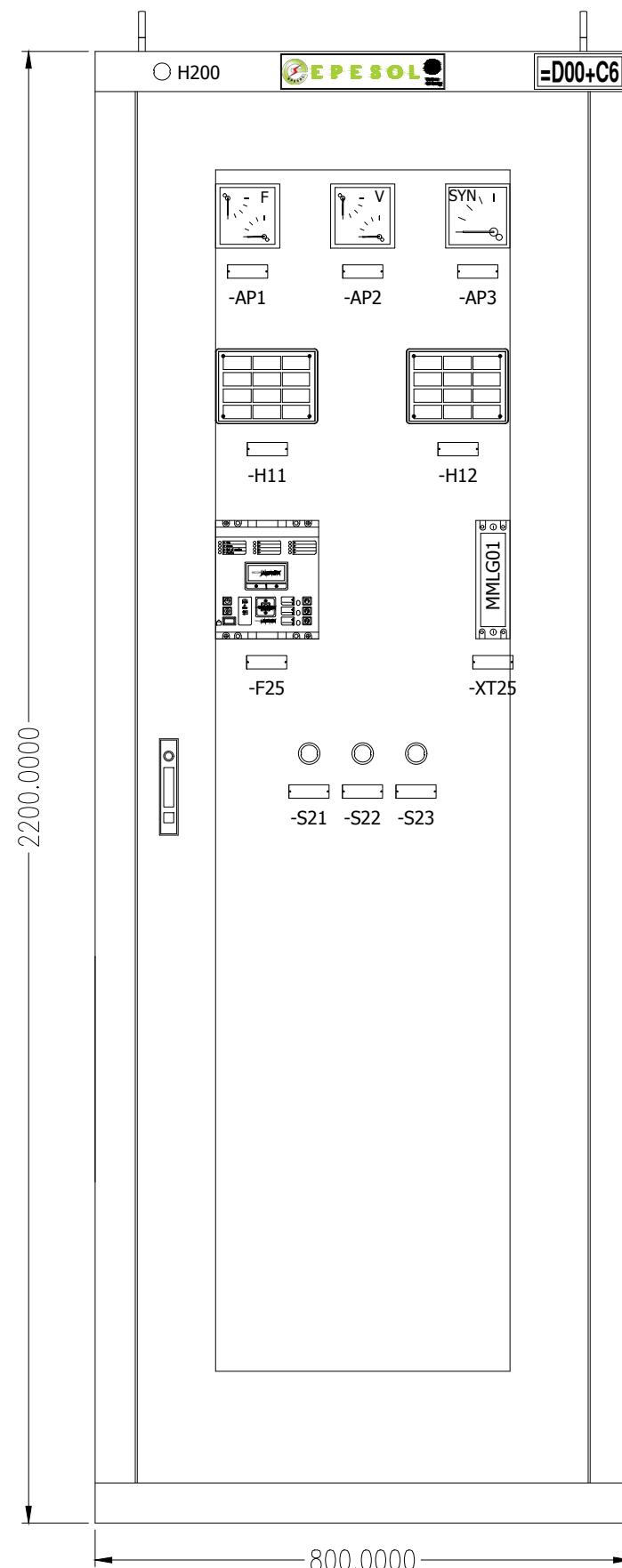
Drawing no. P60194-E-DSC-SC-001

Project no. P-60194 Sheet type AB Sheet no. 03

	1	2	3	4	5	6	7	8			
	QTY.	DEVICE DESCRIPTION		DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION		MANUFACTURER		
A	01	SYNCHRO CHECK RELAY		AGILE P94V, Cortec: P94VP16A7C0520A Supply: 24-250VDC / 110-240VAC, 4 VT Inputs, 8 Opto Inputs, 8 Relay Outputs 8 Opto Inputs, 8 Relay Outputs			-F25		GE		
	01	TEST BLOCK		MMLG01, Cortec: MMLG01-R1AA9002D			-XT25		GE		
	02	CONTROL MCB - PANEL LIGHT & HEATER		2-Pole, Ratings: 2A, 240VAC, 10kA @ 240VAC, 2 C/O Contacts, Ord: G62C02+CAH(2)			-F101-102		GE		
B	01	CONTROL MCB - AC BELL CIRCUIT		2-Pole, Ratings: 2A, 240VAC, 10kA @ 240VAC, 2 C/O Contacts, Ord: G62C02+CAH(2)			-F104		GE		
	01	CONTROL ELCB - PANEL SOCKET		2-Pole, Ratings: 16A, 30mA, 240VAC, 1P+N, 2 C/O Contacts, Ord: DM100C16/030+CAH(2)			-F103		GE		
	02	CONTROL MCB - DC DISTRIBUTION		2-Pole, Ratings: 4A, 250VDC, 10kA @ 250VDC, 2 C/O Contacts, Ord: EP102UCC04+CAH(2)			-F201-202		GE		
	01	CONTROL MCB - DC HOOTER CIRCUIT		2-Pole, Ratings: 4A, 250VDC, 10kA @ 250VDC, 2 C/O Contacts, Ord: EP102UCC04+CAH(2)			-F203		GE		
C	02	CONTACTOR RELAY		Coil Voltage: 230VAC @ 50/60 Hz, 6A, 4 C/O Contacts, Ord: PRC4M40ANL			-KACM, -KDC		GE		
	01	AUXILIARY CONTACTOR - SUPPLY CHANGEOVER		Coil Voltage: 220VDC, 16A, 3 NO + 3 NC Contacts, Ord: MCRC022ATWN+MARN211AT			-KCS		GE		
	39	CONTACTOR RELAY		Coil Voltage: 220VDC, DIODE, 4 C/O Contacts, Ord: PRC4M40DCML			-KDCM, -KAC, -KS1, -KS1-1, -KS1-2, -KS1-3, -KS2, -KS2-1, -KS2-2, -KS2-3, -KS5, -KS5-1, -KS5-2, -KS5-3, -K11, -KS6, -KS6-1, -KS6-2, -KS6-3, -KS8, -KS8-1, -KS8-2, -KS8-3, -K12, -K25-1, -K25-2, -K25-3, -K25F, -K101, -K102, -K103, -K104, -K105, -KSCU1, -KSCU2, -KSCU5, -KSCU6, -KSCU8, -KDC1		GE		
	01	TIMER		Type: 220VDC, 0-60s, 2 C/O Contacts, Ord: AT8N			-KT		AUTONICS		
	01	INDICATION LAMP - DC SUPPLY FAILURE		Type: Integrated LED, Color : RED , Supply : 230VAC @ 50Hz, Ord: YS-PL-2-AL-22-R-W			-H200		YONGSUNG		
D	01	PUSH BUTTON - ACKNOWLEDGE		Type: Switch (A Type), Color : BLACK , Supply : 220VDC, Ord: YS-AP1-2-31-B-D-W			-S21		YONGSUNG		
	01	PUSH BUTTON - LAMP TEST		Type: Switch (A Type), Color : RED , Supply : 220VDC, Ord: YS-AP1-2-31-R-D-W			-S22		YONGSUNG		
	01	PUSH BUTTON - RESET		Type: Switch (A Type), Color : GREEN , Supply : 220VDC, Ord: YS-AP1-2-31-G-D-W			-S23		YONGSUNG		
E	01	PANEL LIGHT		230VAC @ 50Hz, 05W, Ord: YS-T8-30-5W			-H100		YONGSUNG		
	01	DOOR SWTICH		230VAC @ 50Hz, 1 NO Contact, Ord: YS P3315GW-B + YS MS-C			-S100		YONGSUNG		
	01	THREE PIN SOCKET		1N+PE, 16A, 230VAC @ 50Hz			-X100		LOCAL		
F	01	PANEL HEATER		230VAC @ 50Hz, 60W			-R100		E-LABS		
	01	HUMIDITY & TEMPERATURE CONTROLLER		40-90%RH, 25-50 deg.C, 230VAC @ 50Hz			-B100		E-LABS		
	01	DUAL VOLT METER		METER: 90 DEGREE ANALOGUE DOUBLE VOLT METER, INPUT 0...110/165 VAC (L-L), ACCURACY CLASS 1 SCALE 0...220/330 KV (MARKED RED AT 220 KV), Ord: F96YVE			-AP2		FRER		
G	01	DUAL FREQUENCY METER		METER: 90 DEGREE ANALOGUE DOUBLE FREQUENCY METER, INPUT 0...110/165 VAC (L-L), ACCURACY CLASS 0.1, SCALE 45...55 Hz, Ord: F96VFE			-AP1		FRER		
	01	SYNCHROSCOPE		SIZE: 96X96 mm, Ord: F96YX			-AP3		FRER		
	02	ANNUNCIATORS		12-WINDOW, SUPPLY: 100-275VAC/ 100-375 VDC			-H11, -H12		E-LABS		
H	0	AS BUILT		18.08.2018	MSC	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 SYNCHRONIZING PANEL (=D00+C6) COMPONENT LIST	Drawing no. P60194-E-DSC-SC-001
							Project no. P-60194				
	REV.	DESCRIPTION		DATE	DRAWER						

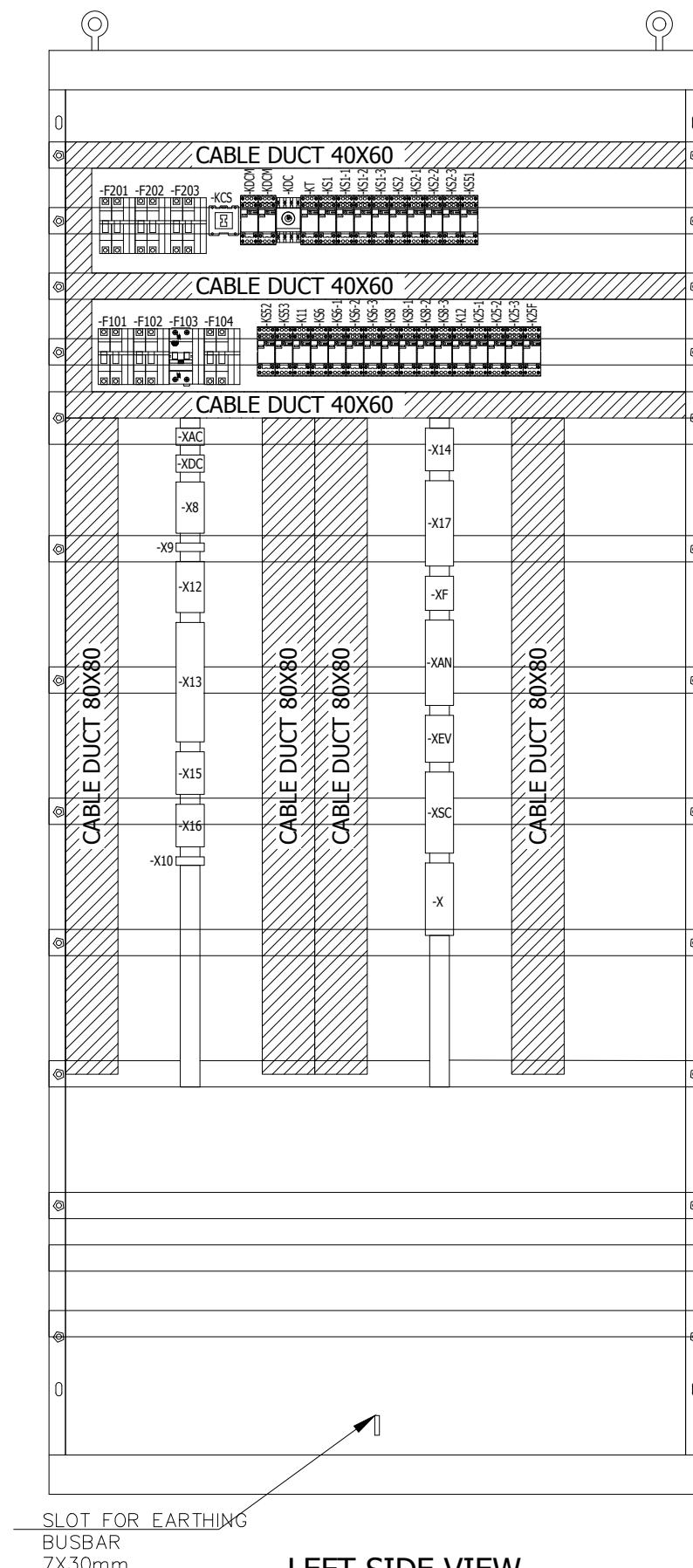
	1	2	3	4	5	6	7	8				
	QTY.	DEVICE DESCRIPTION		DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER				
A	01	AC BELL		Type: Exposure, 220VAC, Ord: YS MB7-22A			-B1	YONGSUNG				
	01	DC HOOTER		Type: AH-101, 220VDC			-H1	E-LABS				
B	04	TERMINAL BLOCKS - AC SUPPLY DISTRIBUTION		Screw-type, Feed Through Terminal, CBD-4			-XAC	CABUR				
	04	TERMINAL BLOCKS - DC SUPPLY DISTRIBUTION		Screw-type, Feed Through Terminal, CBD-4			-XDC	CABUR				
	36	TERMINAL BLOCKS - SYNC VT CIRCUIT		Screw-type, Feed Through Terminal, SCB-6			-X2, -X3, -X4, -X5, -X6, -X7	CABUR				
	02	TERMINAL BLOCKS - TIMER CIRCUIT		Screw-type, Feed Through Terminal, CBD-4			-X9	CABUR				
	20	TERMINAL BLOCKS - SYNC CIRCUIT		Screw-type, Feed Through Terminal, CBD-4			-X12	CABUR				
	40	TERMINAL BLOCKS - BUS VT HEALTH STATUS		Screw-type, Feed Through Terminal, CBD-4			-X13, -X8	CABUR				
	20	TERMINAL BLOCKS - COMMON ALARM SIGNALS		Screw-type, Feed Through Terminal, CBD-4			-X15, -X16	CABUR				
	30	TERMINAL BLOCKS - CB CLOSING PERMISSION		Screw-type, Feed Through Terminal, CBD-4			-X17, -X14	CABUR				
	20	TERMINAL BLOCKS - AC ANNUNCIATION		Screw-type, Feed Through Terminal, CBD-4			-XAN	CABUR				
	08	TERMINAL BLOCKS - BELL/HOOTER CIRCUIT		Screw-type, Feed Through Terminal, CBD-4			-XF	CABUR				
C	30	TERMINAL BLOCKS - ER, SCADA SIGNALS		Screw-type, Feed Through Terminal, CBD-4			-XEV, -XSC	CABUR				
	18	TERMINAL BLOCKS - SPARE		Screw-type, Feed Through Terminal, CBD-4			-X	CABUR				
D	04	TERMINAL BLOCKS - SPARE		Screw-type, Feed Through Terminal, SCB-6			-X	CABUR				
E												
F	0	AS BUILT		18.08.2018	MSC	Manufacturer  <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  <b>Grid Solutions</b> A GE and Alstom joint venture	Client  <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) COMPONENT LIST	Drawing no. P60194-E-DSC-SC-001	
REV.	DESCRIPTION		DATE	DRAWER					Project no. P-60194	Sheet type AC1	Sheet no. 04a	

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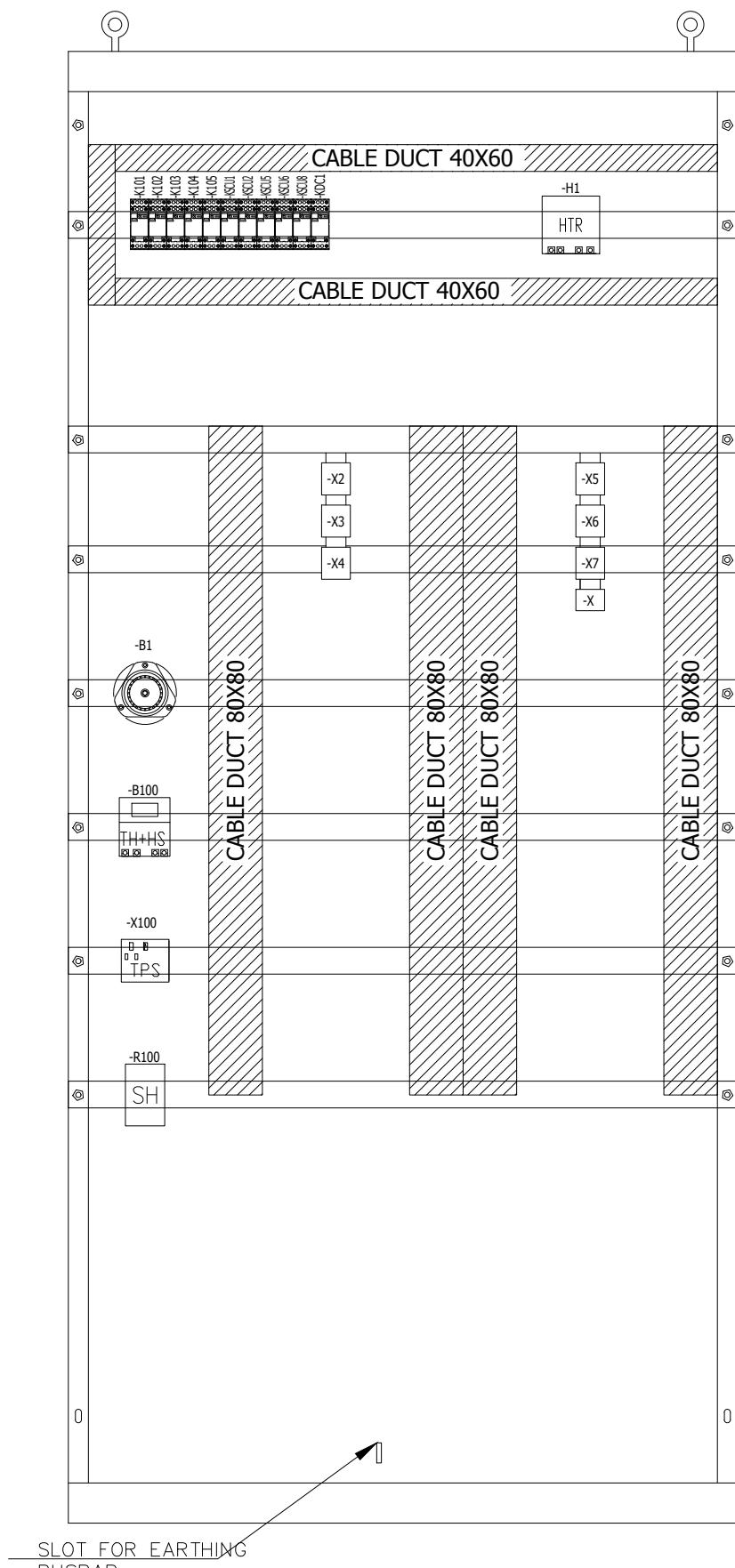


FRONT VIEW

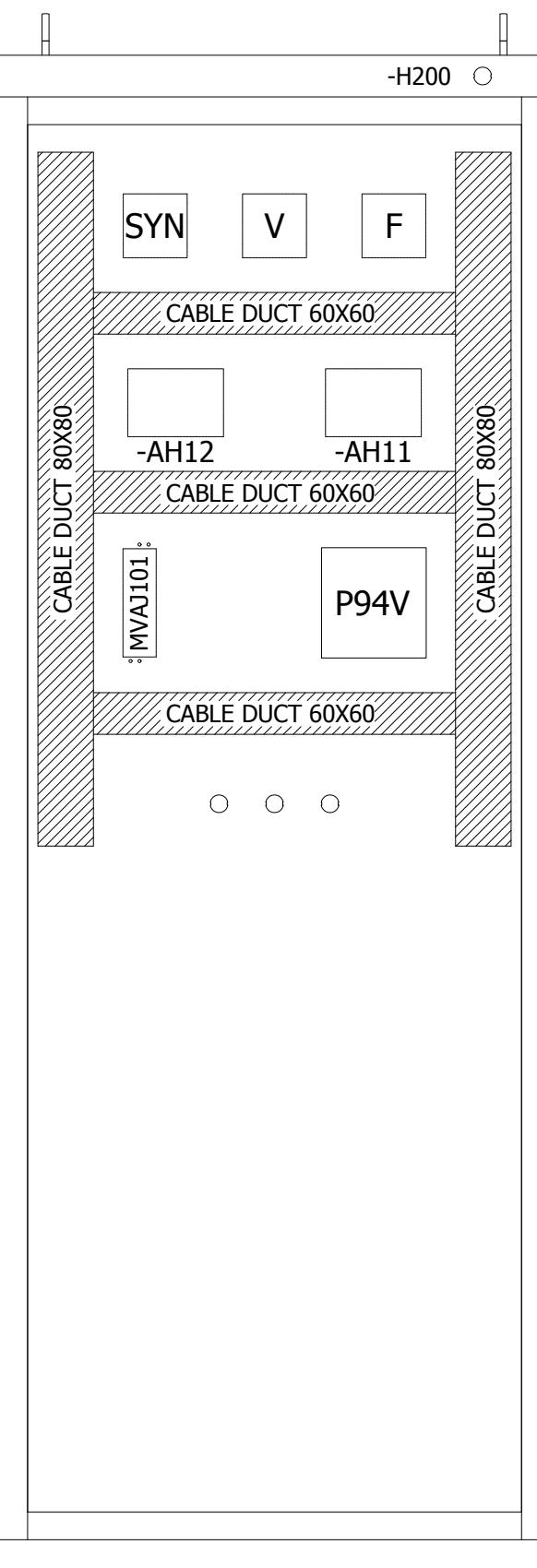
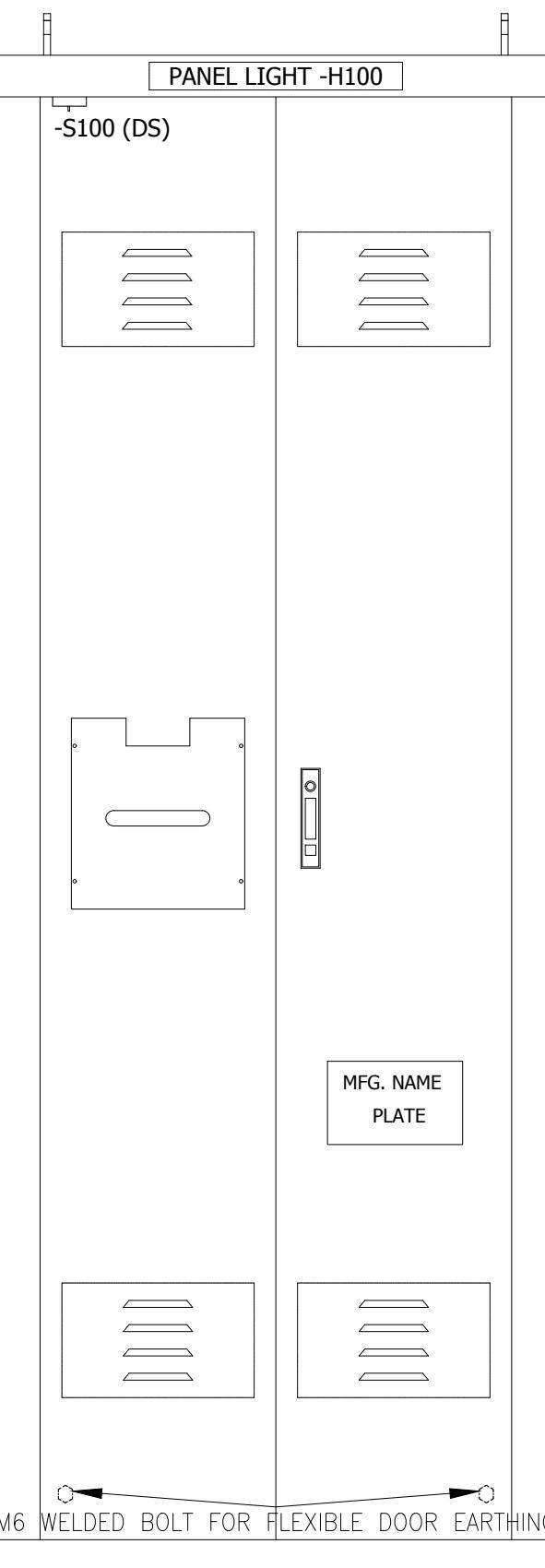
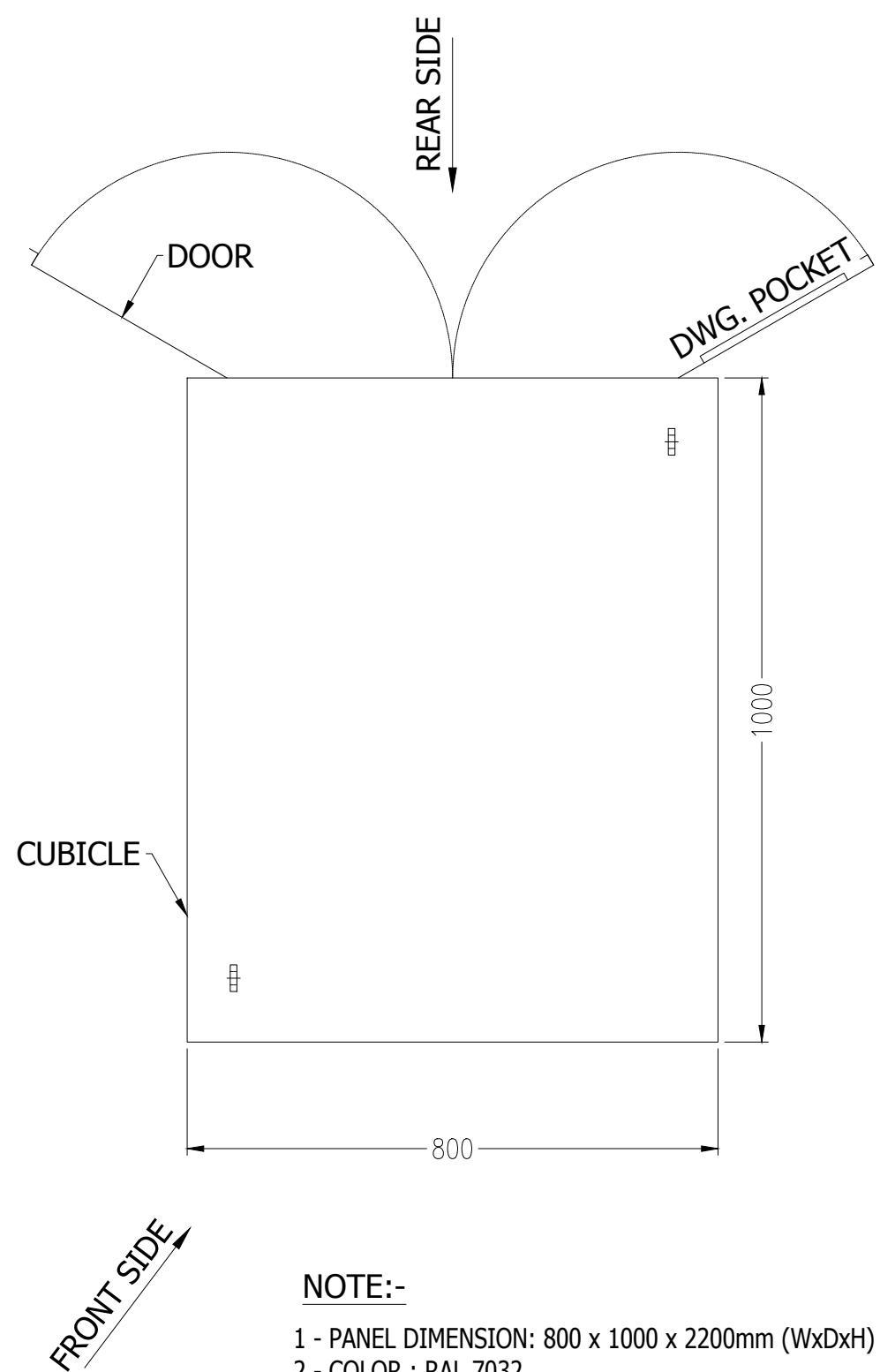
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REV.	DESCRIPTION	DATE	DRAWER						
1		2							



LEFT SIDE VIEW



RIGHT SIDE VIEW

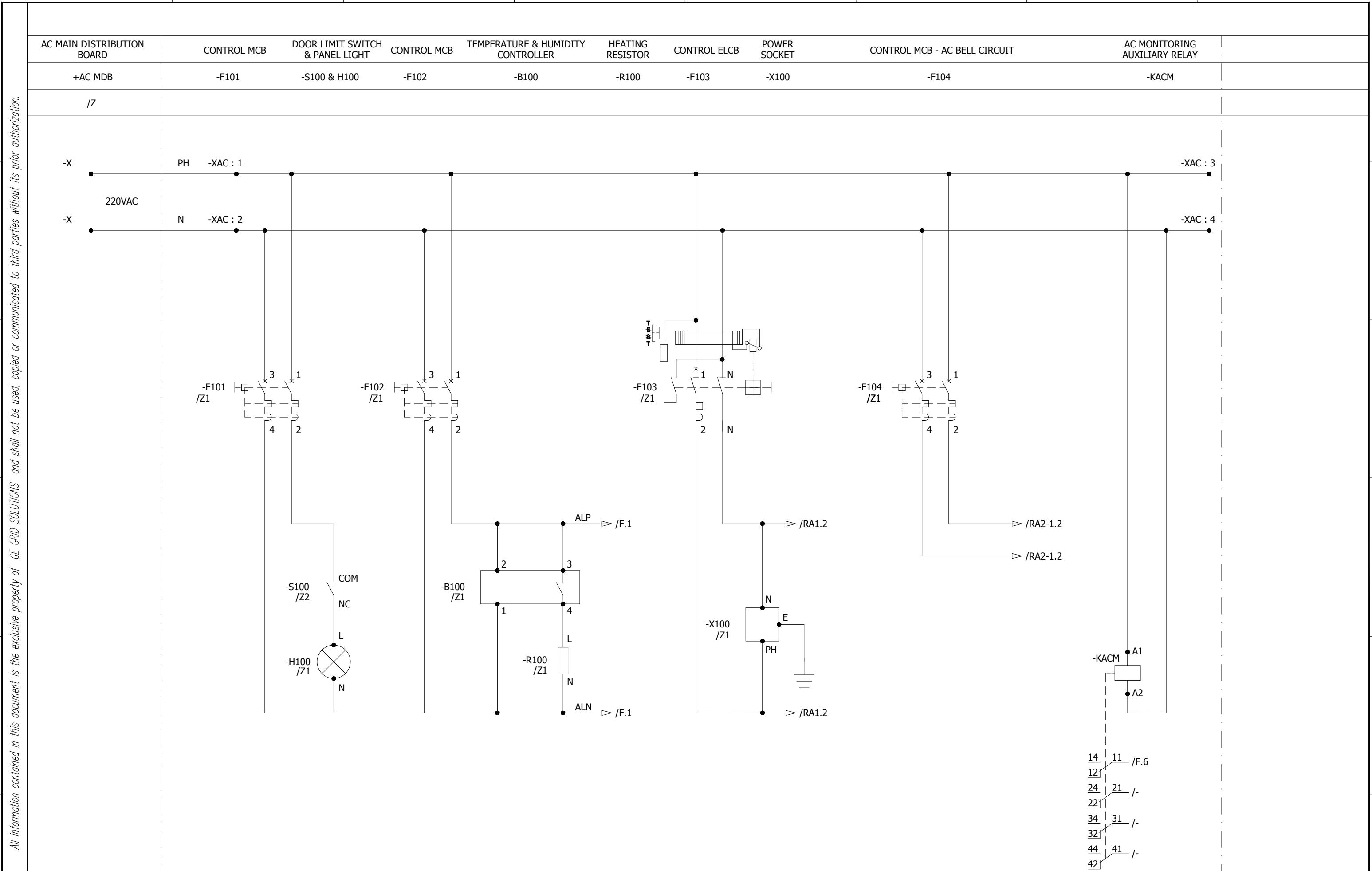
BACK VIEWBACK VIEWTOP VIEWNOTE:-

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

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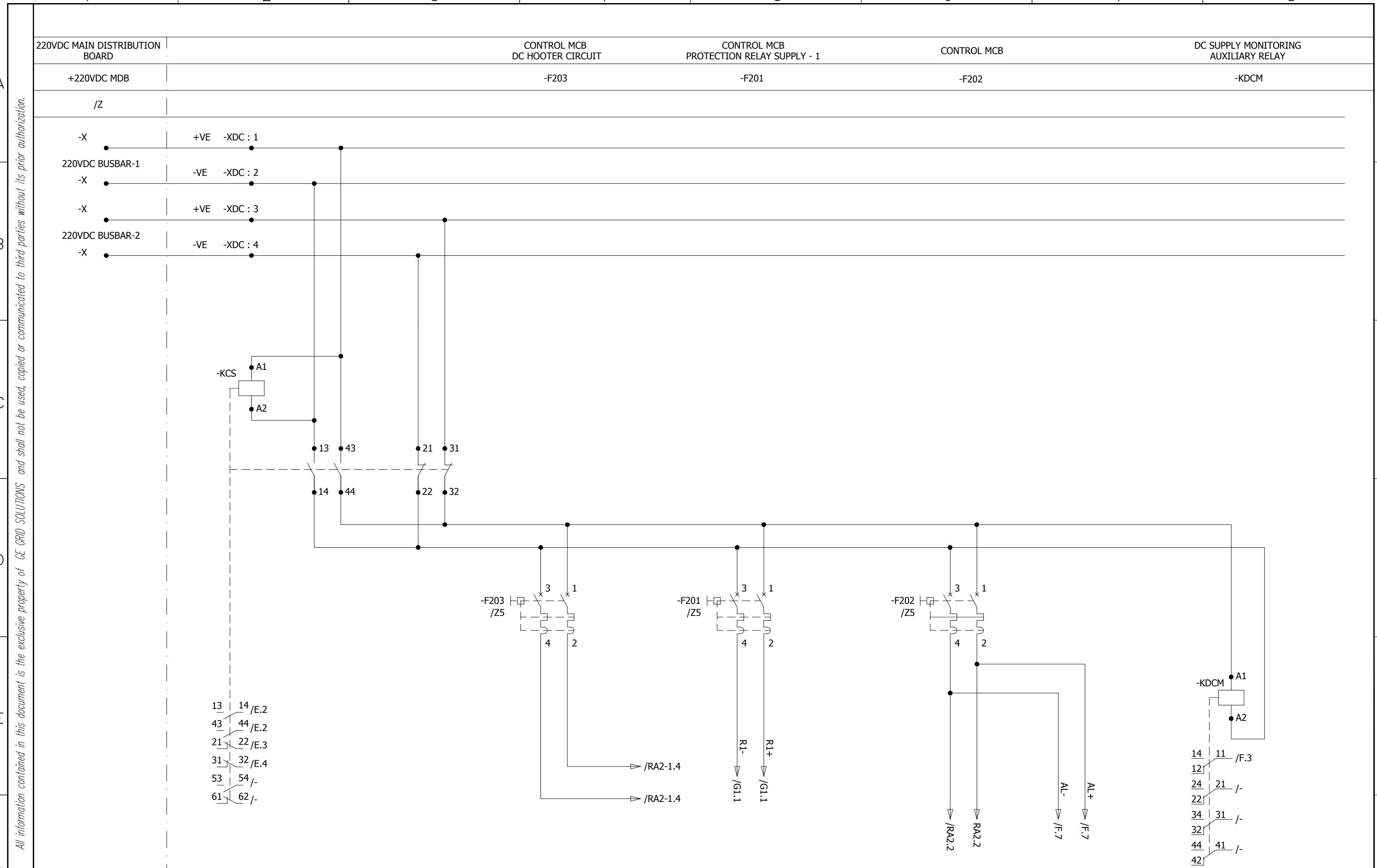
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194

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0	AS BUILT	18.08.2018	MSC	Manufacturer	Contractor	Client	Project	Title	Drawing no.
				<b>EPESOL</b> 7-B Garden Block, New Garden Town, Lahore, Pakistan	<b>Grid Solutions</b> A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	220kV SYNCHRONIZING PANEL (=D00+C6) AC SUPPLY DISTRIBUTION	P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type D Sheet no. 06

14 11 /F.6  
12 21 /-  
24 21 /-  
22 31 /-  
34 31 /-  
32 41 /-  
44 41 /-  
42 /-



0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) DC SUPPLY DISTRIBUTION	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type E
									Sheet no. 07

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## 220V DC CIRCUIT FAULTY

## 220V DC CIRCUIT FAULTY INDICATION

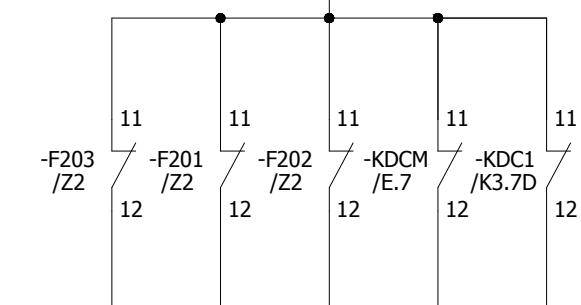
## 220V AC CIRCUIT FAULTY

-KDC

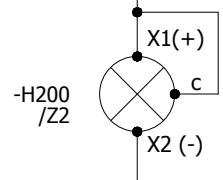
-H200

-KAC

/D.4 ➤ ALP



-KDC  
/F.3  
41  
44



/D.4 ➤ ALN

-KDC

A1

A2

14 11 /RA1.4  
12  
24 21 /RA3.7  
22  
34 31 /RA3.8  
32  
44 41 /5C  
42

-F203/Z2

-F201/Z2

-F202/Z2

-KDCM/E.7

-KDC1/K3.7D

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/E.7 ➤ AL+

-

➡ /I1.1

-F104/Z2

-F101/Z2

-F102/Z2

-F103/Z2

-KACM/D.7

11

11

11

-KAC

A1

A2

/E.7 ➤ AL-

-

➡ /I1.1

14 11 /RA2.3  
12  
24 21 /RA3.6  
22  
34 31 /RA3.8  
32  
44 41 /-  
42

14 11 /RA2.3  
12  
24 21 /RA3.6  
22  
34 31 /RA3.8  
32  
44 41 /-  
42

A

A

B

B

C

C

D

D

E

E

F

F

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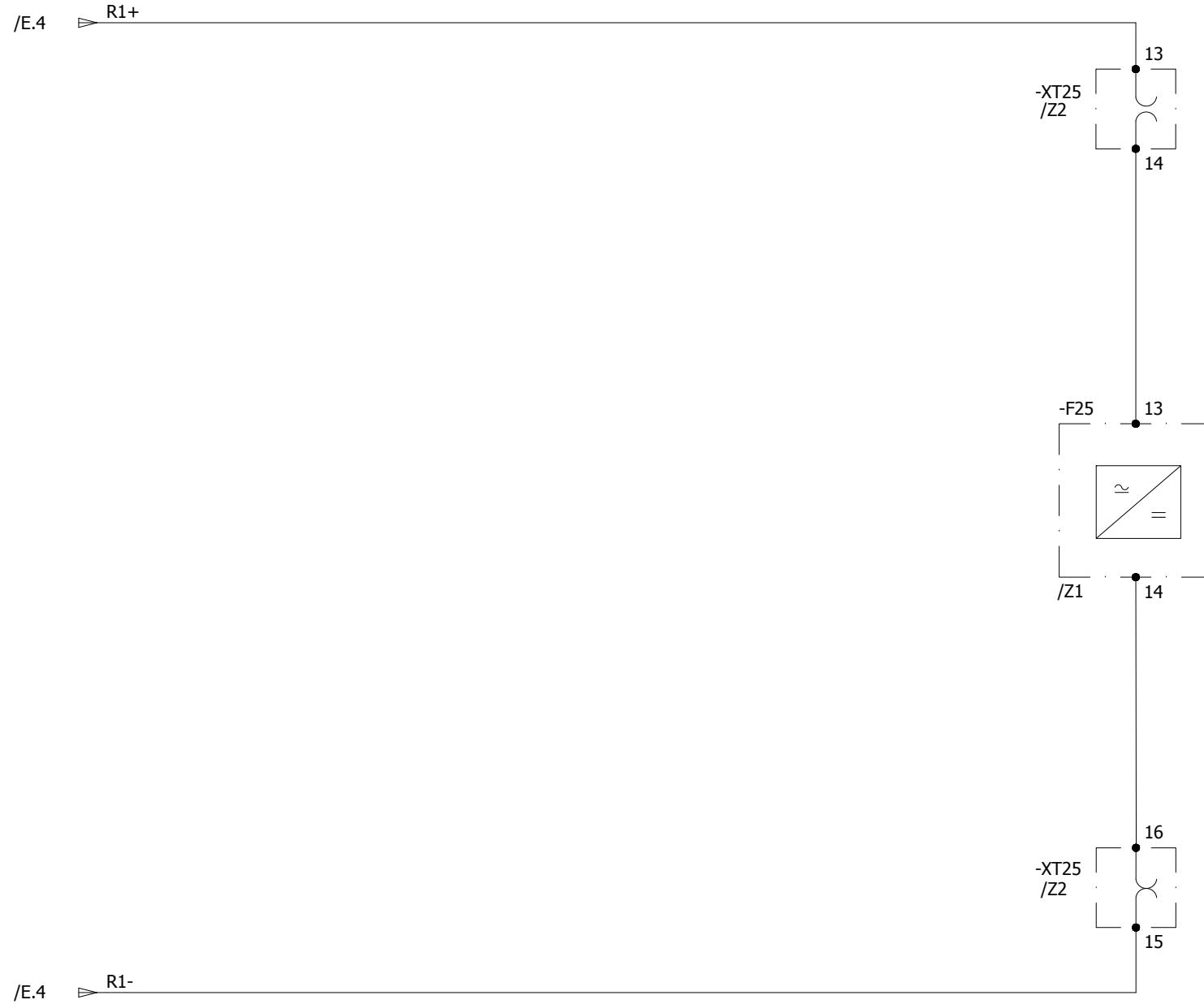
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type F
									Sheet no. 08

## SYNC CHECK

## RELAY SUPPLY



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A

A

B

B

C

C

D

D

E

E

F

F

1

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4

5

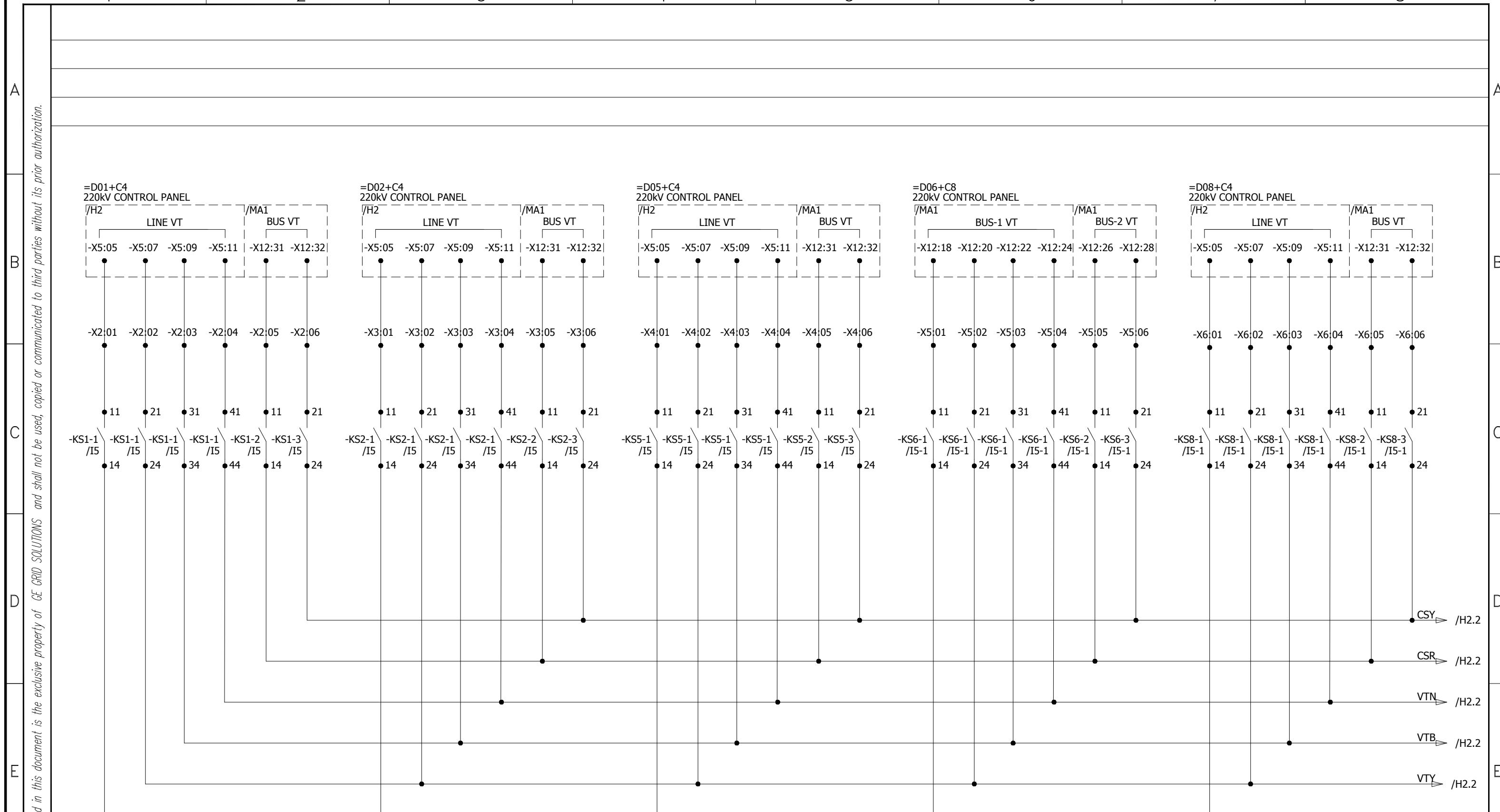
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7

8

0	AS BUILT	18.08.2018	MSC	Manufacturer	Contractor	Client	Project	Title	Drawing no.
				 <b>EPESOL</b> 27-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 SYNCHRONIZING PANEL (=D00+C6) RELAY CONTROL & SUPPLY	P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type G1 Sheet no. 09

1 2 3 4 5 6 7 8



0	AS BUILT	18.08.2018	MSC	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 SYNCHRONIZING PANEL (=D00+C6) SYNC VT CIRCUIT	Drawing no. P60194-E-DSC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type H1	Sheet no. 10
1	2	3	4	5	6	7	8				

TEST BLOCK

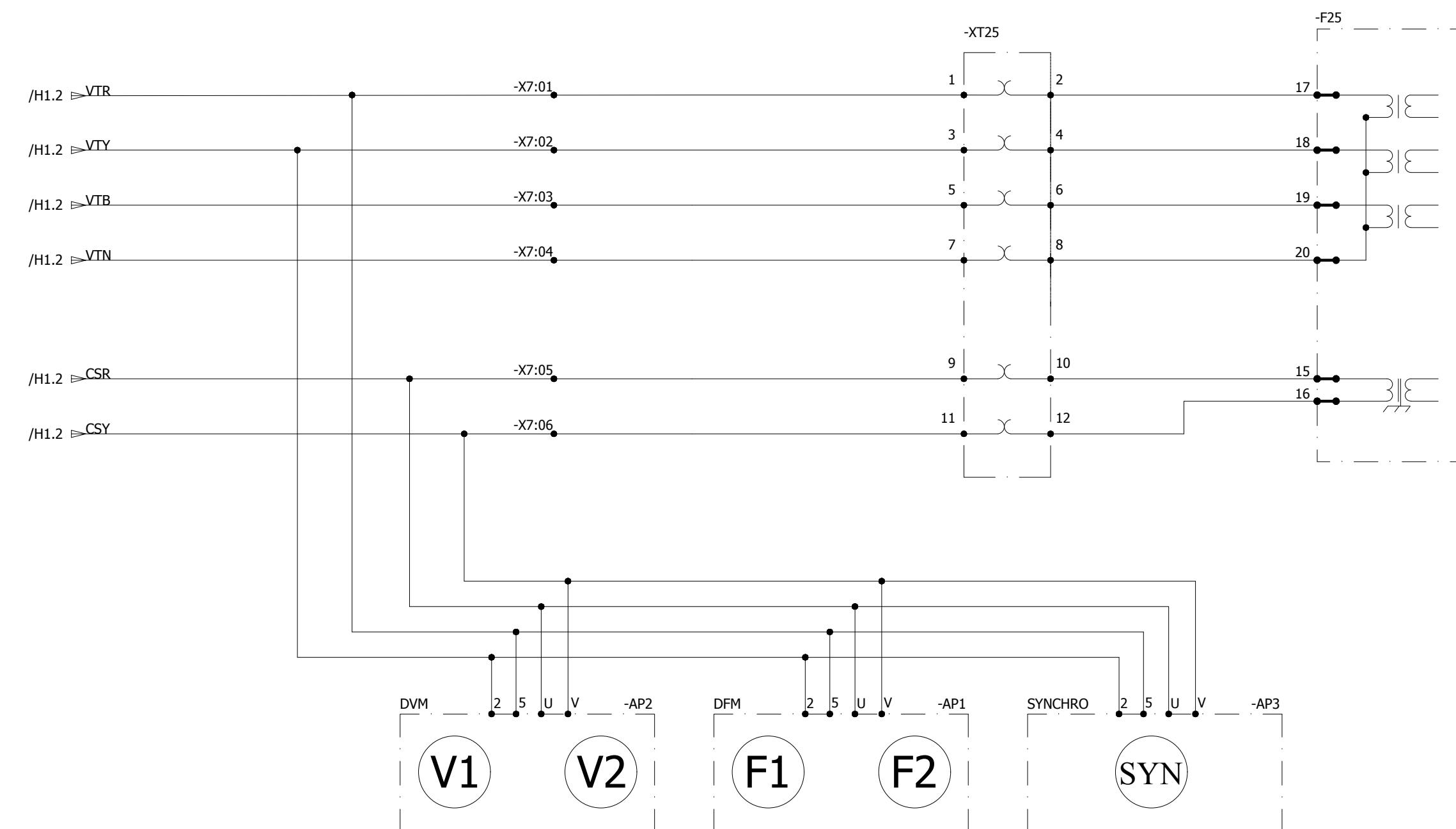
SYNC CHECK  
RELAY

-XT25

-F25

/Z2

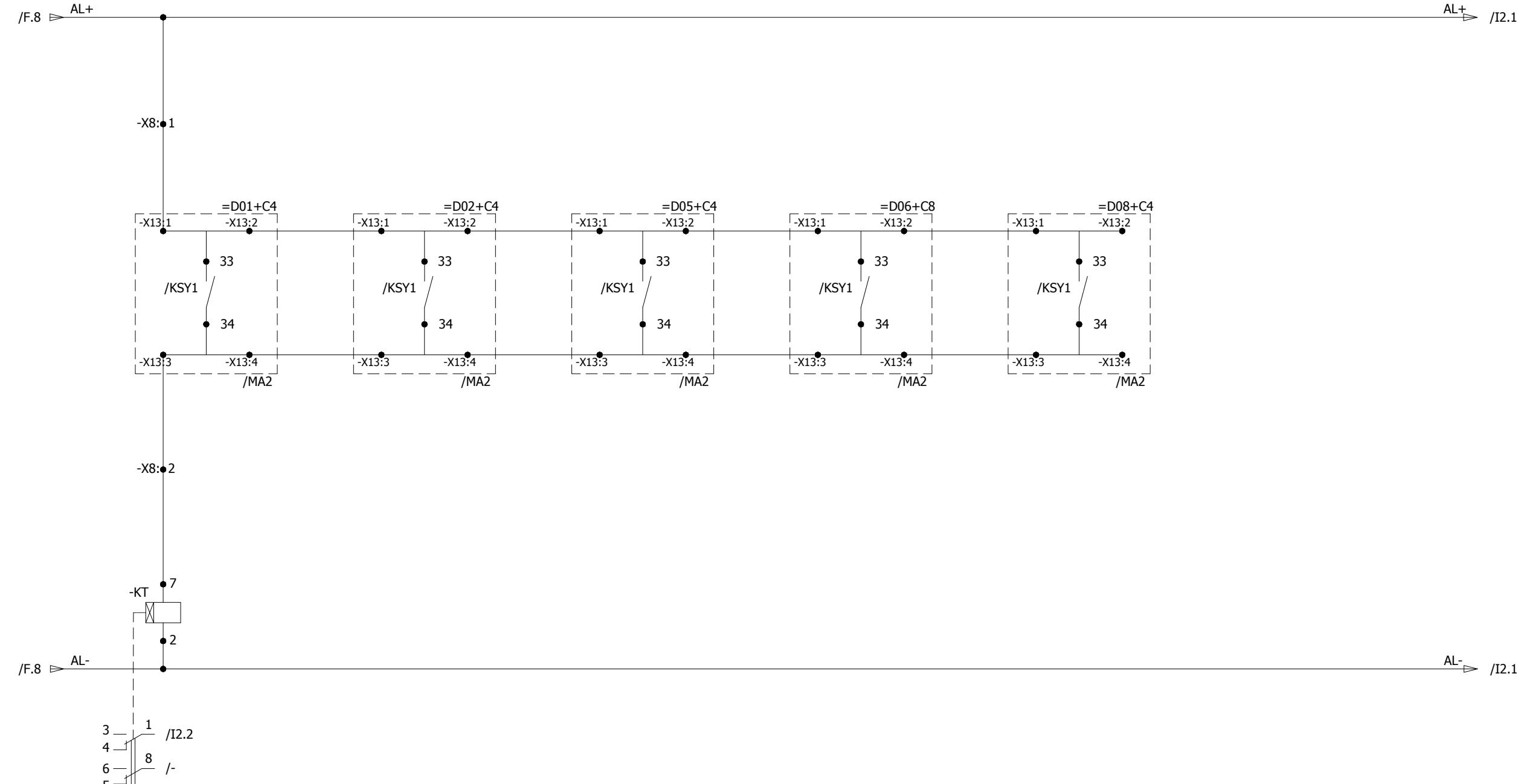
/Z1



0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 7-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>GE</b> 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 SYNCHRONIZING PANEL (=D00+C6) SYNC VT CIRCUIT	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type H2
									Sheet no. 11

## TIMER INITIALIZATION ON ANY CB SELECTION

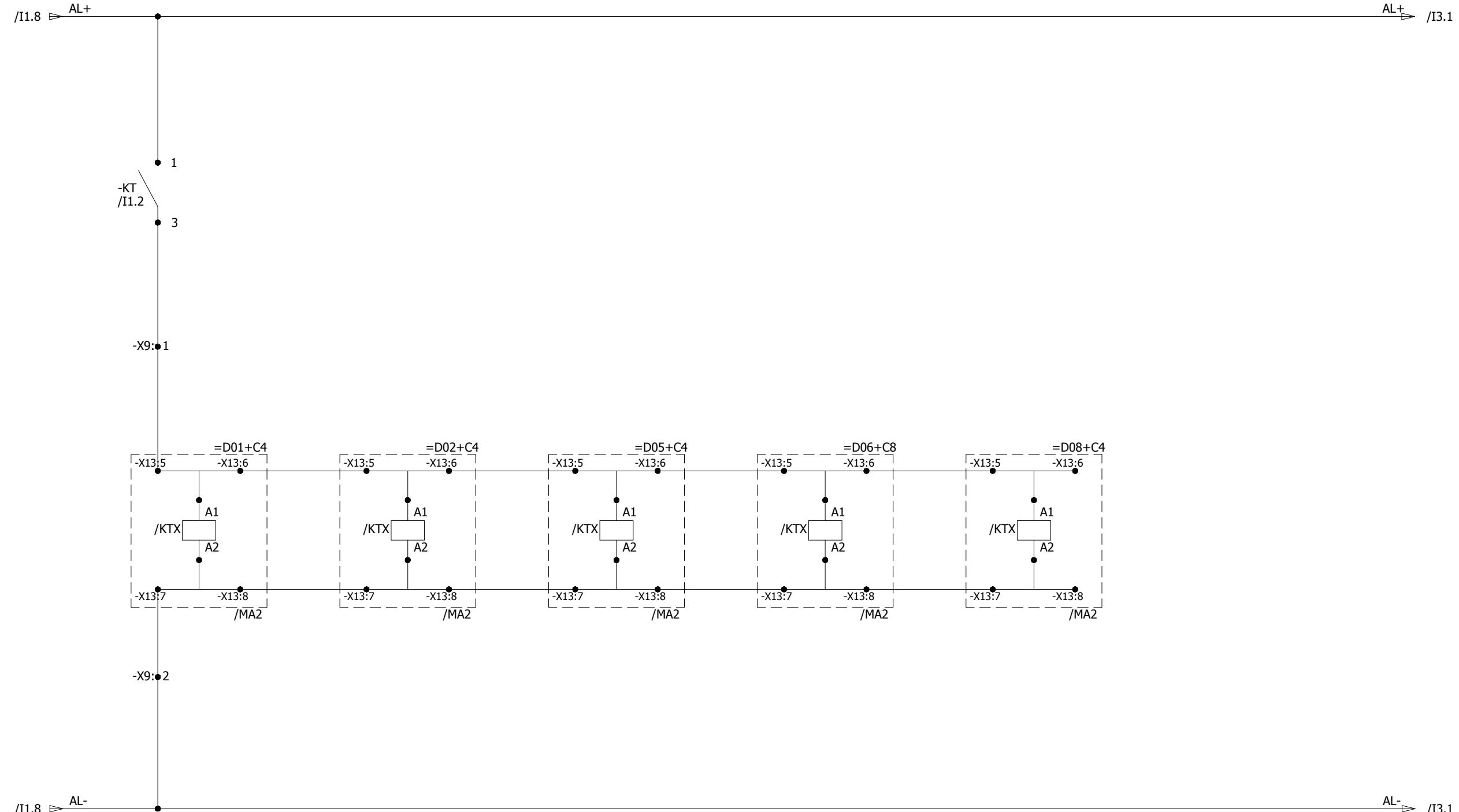
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0	AS BUILT	18.08.2018	MSC	Manufacturer  EPESOL 77-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) TIMER CIRCUIT	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type I1
									Sheet no. 12

## TIMER CONTACT MULTIPLICATION

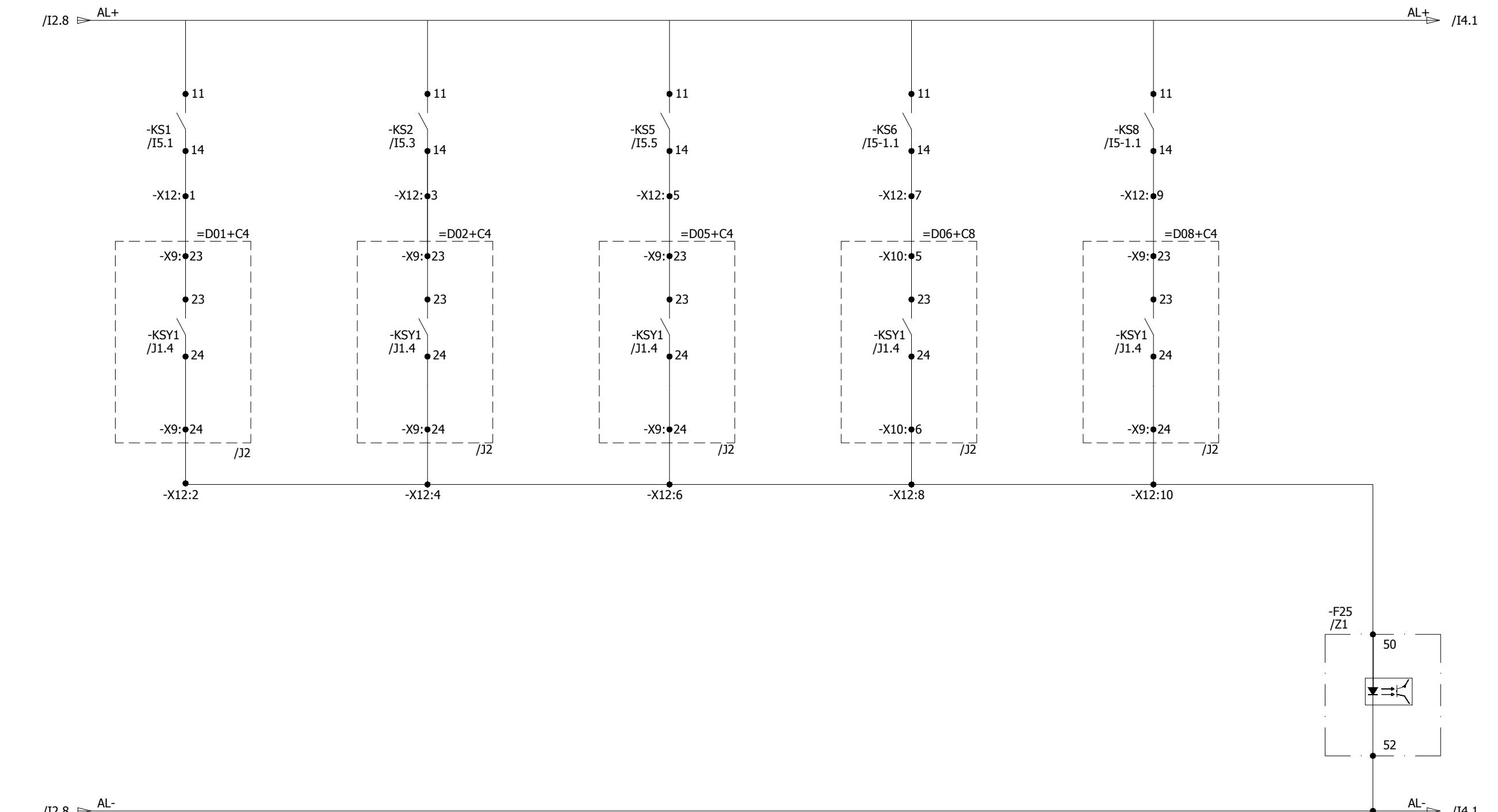
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0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) TIMER CIRCUIT	Drawing no. P60194-E-DSC-SC-001
									Project no. P-60194
	DESCRIPTION	DATE	DRAWER						Sheet type I2
REV.									Sheet no. 13

SYNCHRO CHECK ENABLE

LOGIC INPUT

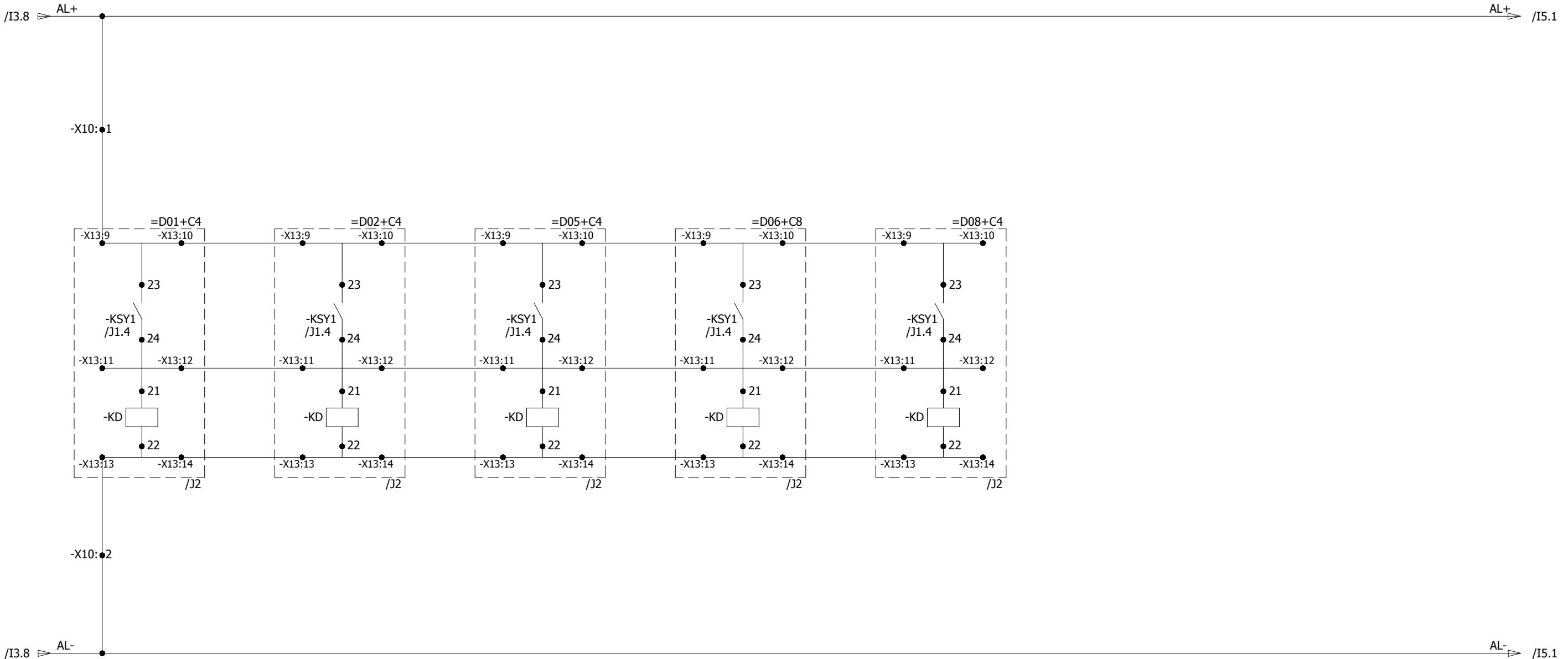


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0	AS BUILT	18.08.2018	MSC	Manufacturer  EPESOL 27-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) SYNC ENABLE CIRCUIT	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type I3
									Sheet no. 14

## DE SELECTION OF CIRCUIT AFTER SELECTION OF ANY CB

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0	AS BUILT	18.08.2018	MSC	Manufacturer  EPESOL 27-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 SYNCHRONIZING PANEL (=D00+C6) CB SELECTION CIRCUIT FOR SYNC	Drawing no. P60194-E-DSC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type I4	Sheet no. 15
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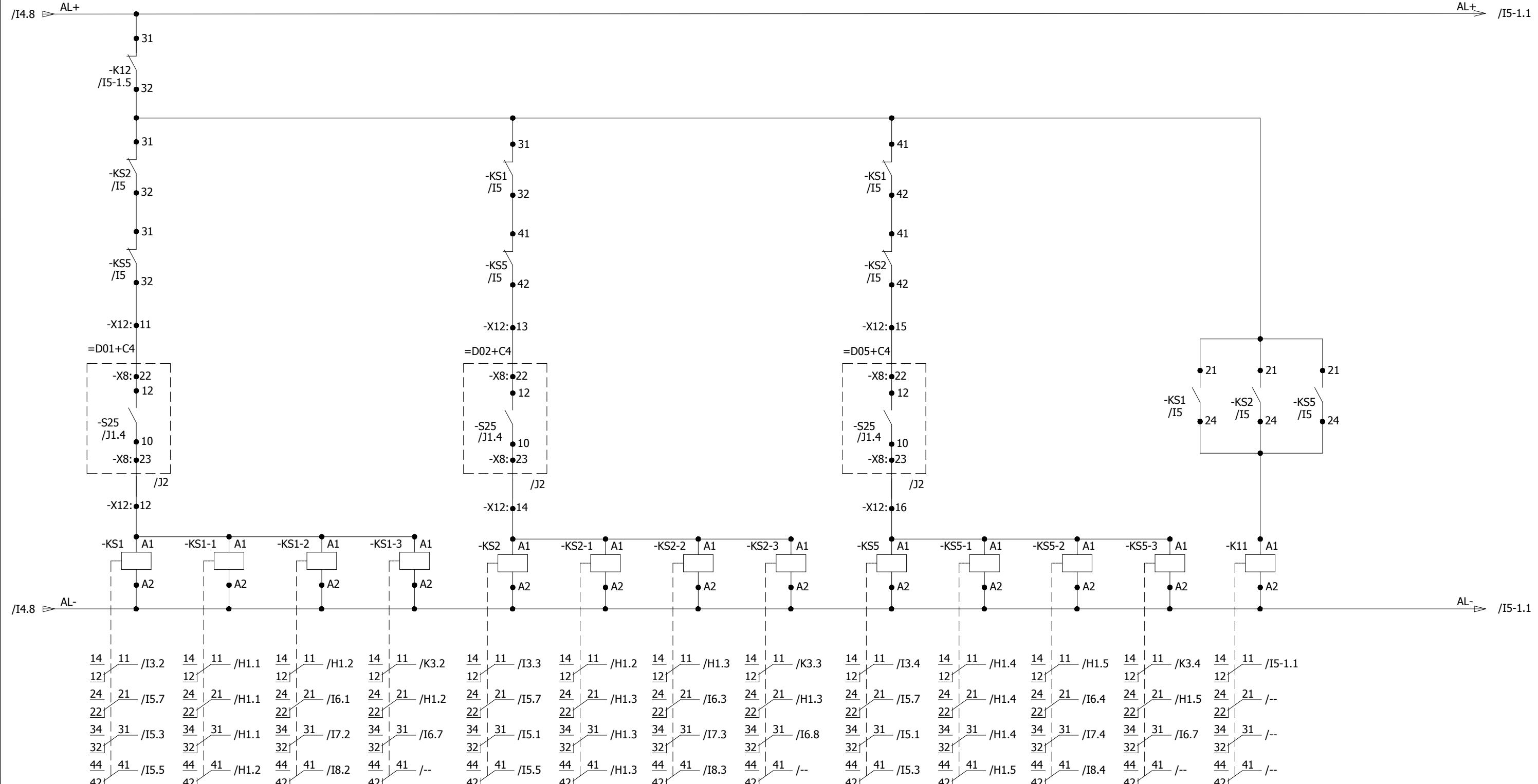
## SYNC KEY INTERLOCKING CIRCUIT

=D01

=D02

=D05

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0	AS BUILT	18.08.2018	MSC	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 SYNCHRONIZING PANEL (=D00+C6) SYNC. KEY INTERLOCKING CIRCUIT	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type I5
									Sheet no. 16

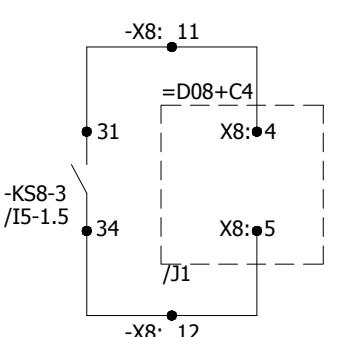
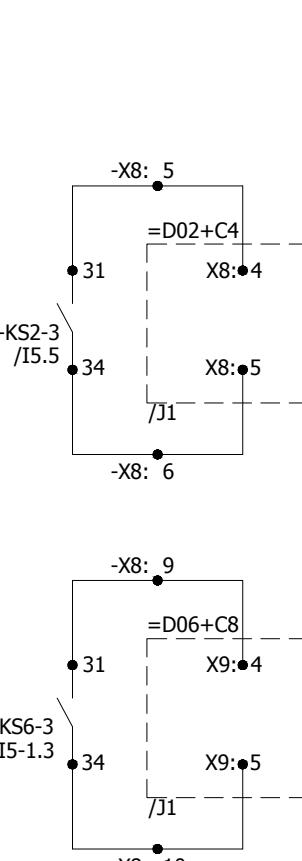
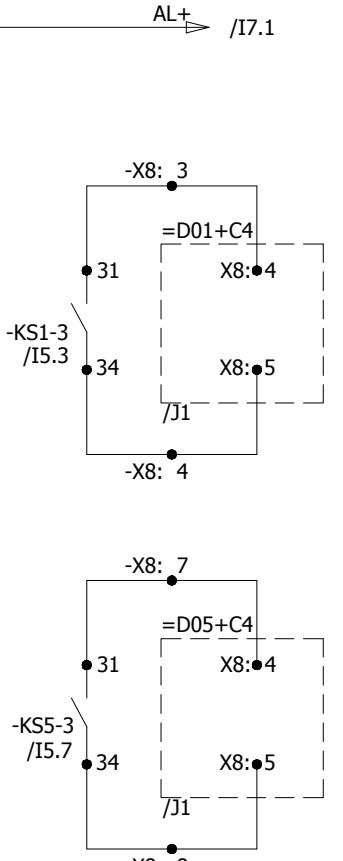
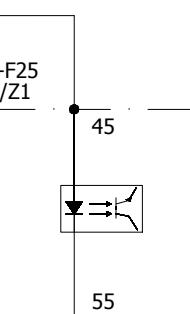
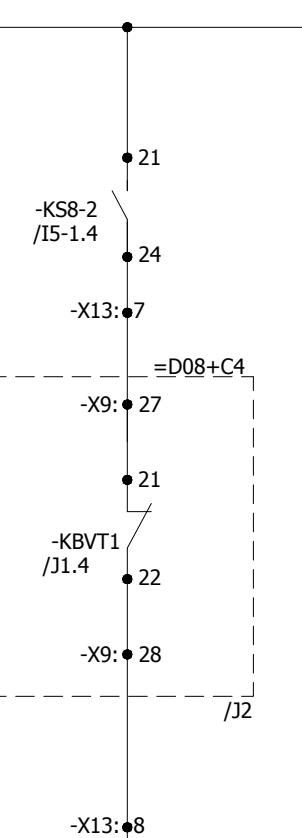
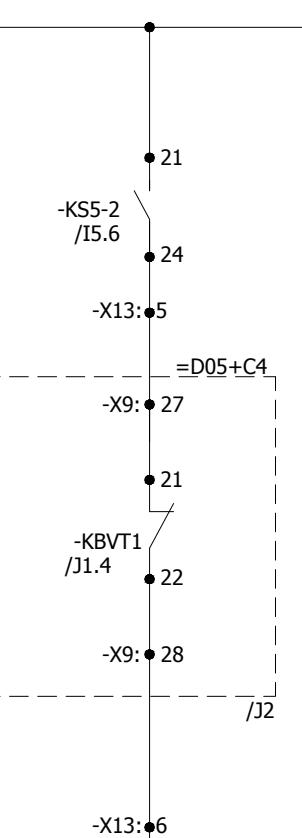
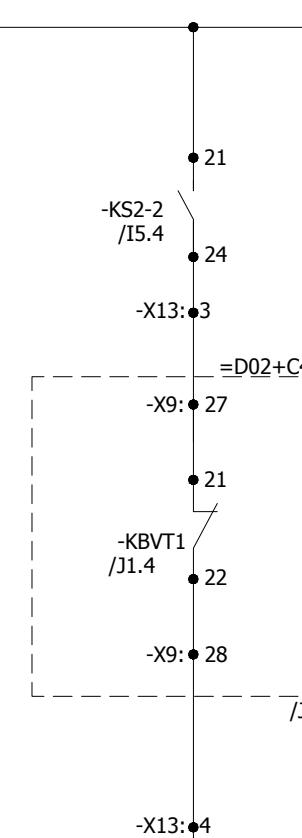
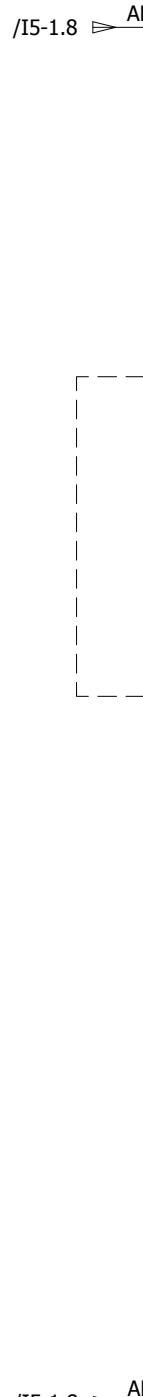


## BUS-1 VT STATUS

## BUS-1 VT STATUS

## LOGIC INPUT

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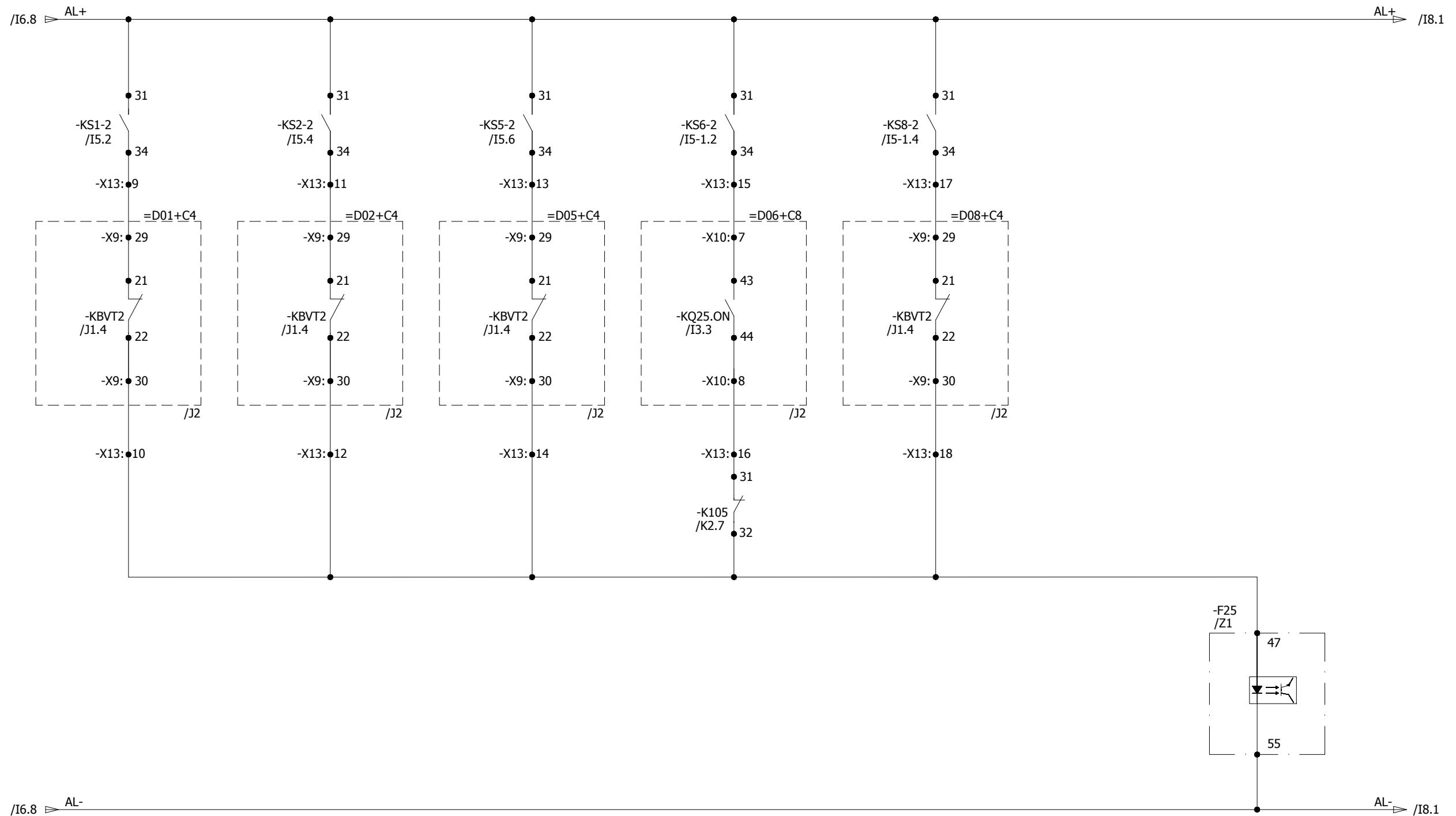


0	AS BUILT	18.08.2018	MSC	Manufacturer  EPESOL 27-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) BUS-1 VT HEALTH STATUS	Drawing no. P60194-E-DSC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type I6	Sheet no. 17
1	2	3	4	5	6	7	8				

## BUS-2 VT STATUS

## BUS-2 VT STATUS

## LOGIC INPUT



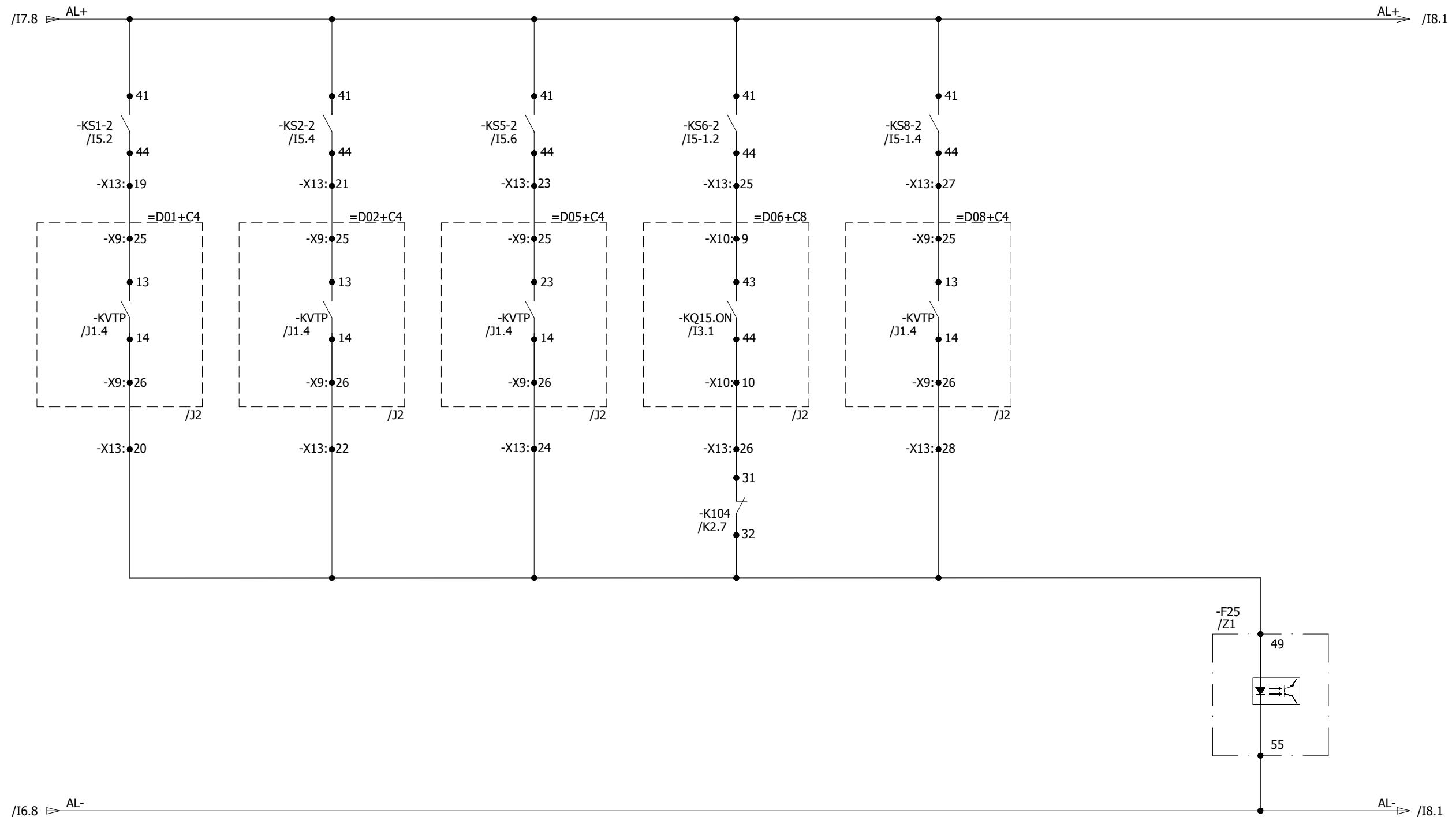
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0	AS BUILT	18.08.2018	MSC	Manufacturer <b>E P E S O L</b> 7-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) BUS-2 VT HEALTH STATUS	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type I7
									Sheet no. 18

## LINE VT STATUS

## LINE VT STATUS

## LOGIC INPUT



0 AS BUILT 18.08.2018 MSC 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 SYNCHRONIZING PANEL (=D00+C6) BUS-2 VT HEALTH STATUS

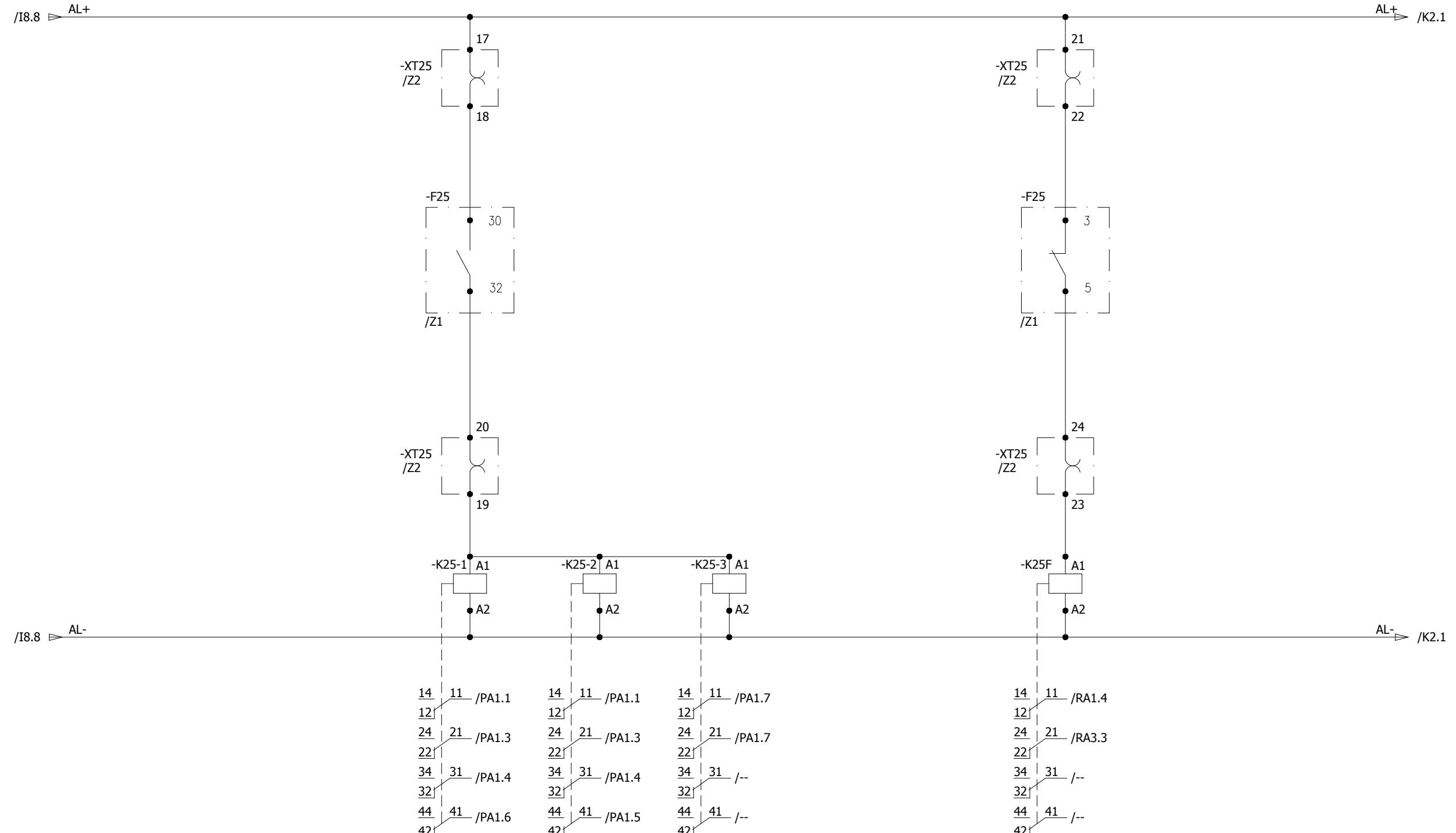
Drawing no. P60194-E-DSC-SC-001  
Project no. P-60194 Sheet type I8 Sheet no. 19

## SYNC CHECK CONTACT

## SYNCH CHECK RELAY

## HEALTH STATUS

All information contained in this document is the exclusive property of GE GRID SOLUTIONS and shall not be used, copied or communicated to third parties without its prior authorization.



A

A

B

B

C

C

D

D

E

E

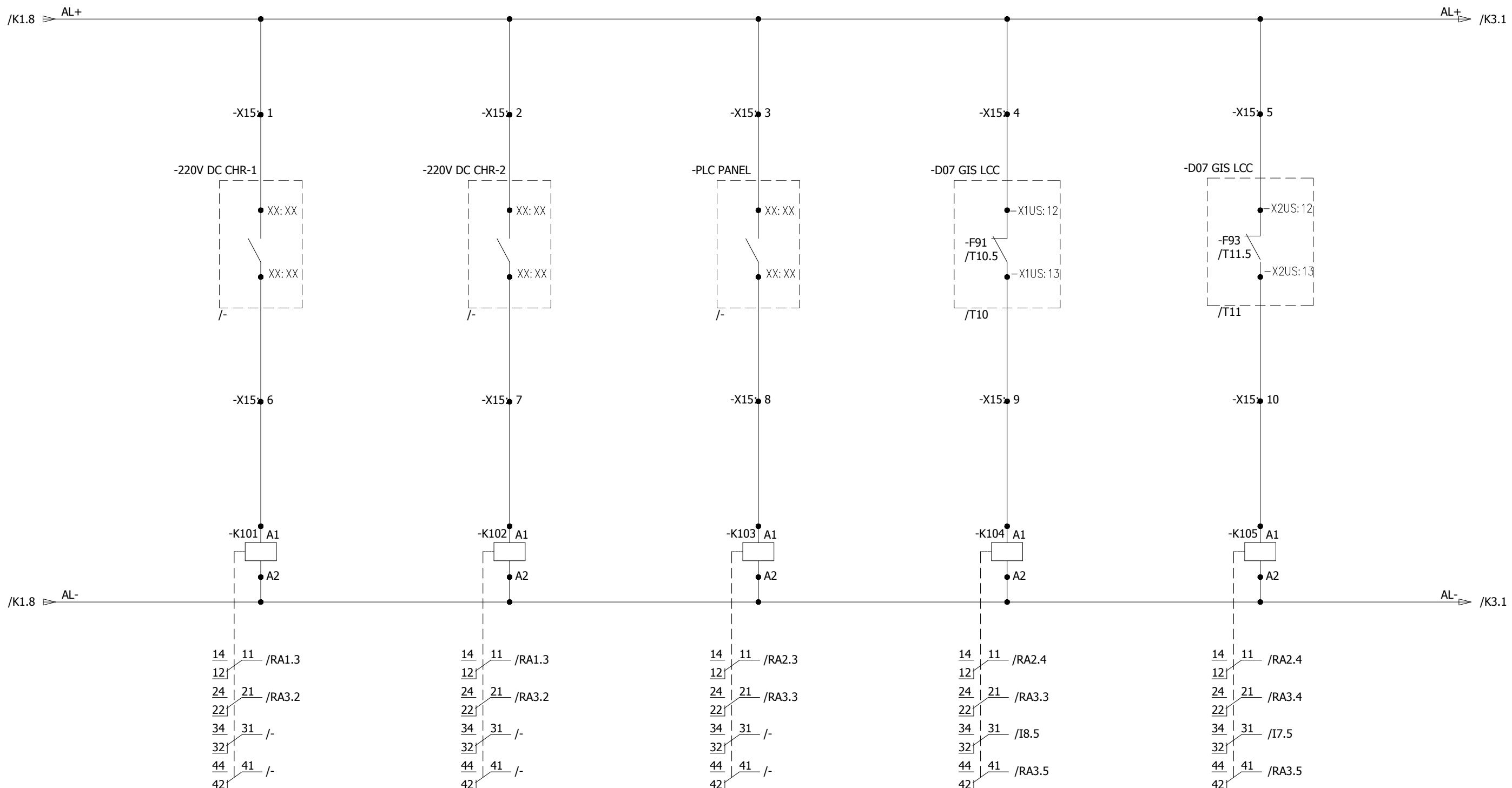
F

F

0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) SYNCHRO CHECK RELAY CONTACT	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type K1
									Sheet no. 20

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E/F 220V DC	E/F 220V DC	PLC PANEL	220KV BB-1 VT	220KV BB-2 VT
SYSTEM 1	SYSTEM 2	FAILURE	FAILURE	FAILURE



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

0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 7-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	Title 220KV SYNCHRONIZING PANEL (=D00+C6) COMMON ALARM SIGNALS	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K2
									Sheet no. 21

## SYNC UNSUCCESSFUL SIGNALS

DC MONITORING

=D01+Q0

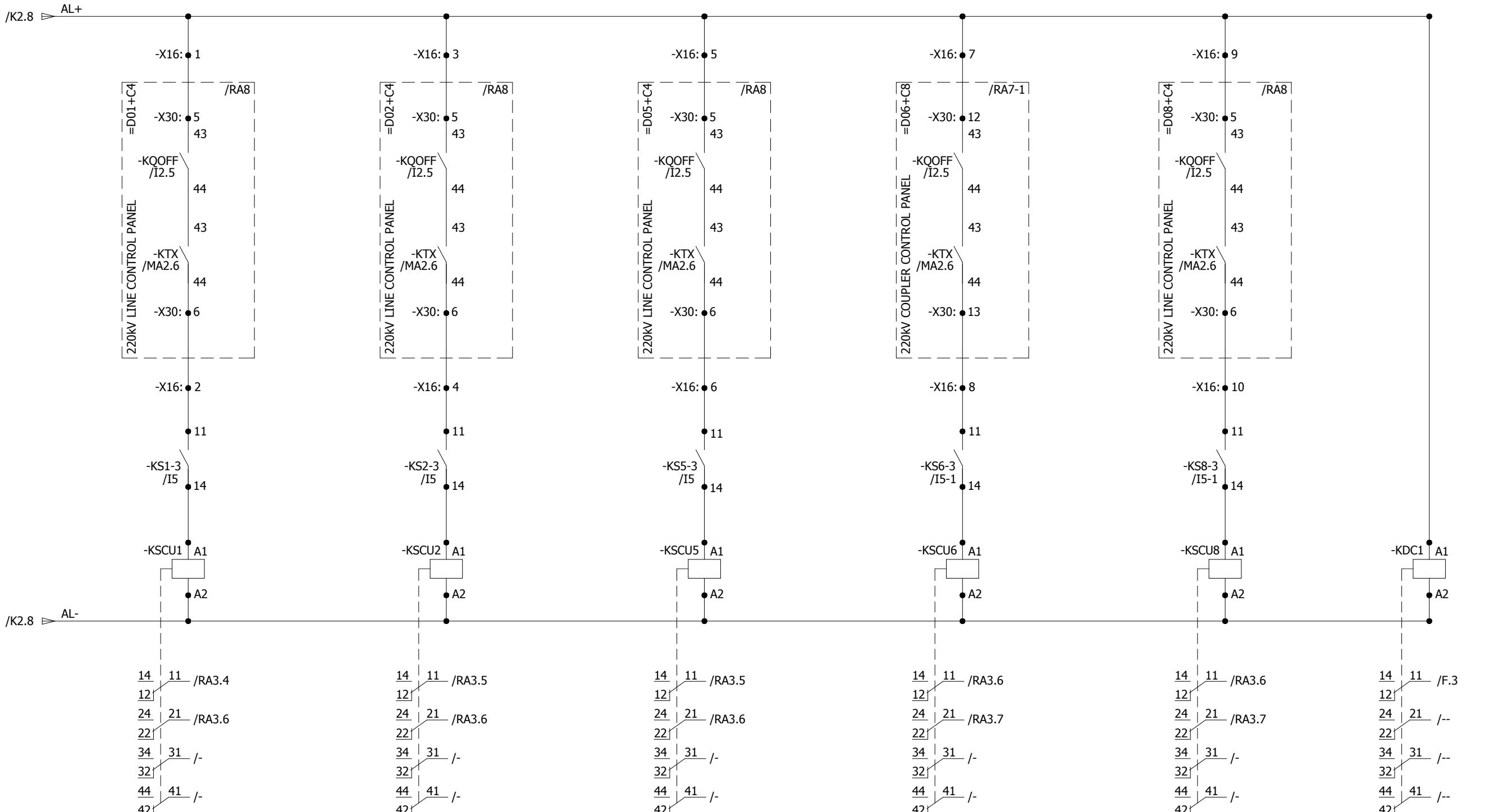
=D02+Q0

=D05+Q0

=D06+Q0

=D08+Q0

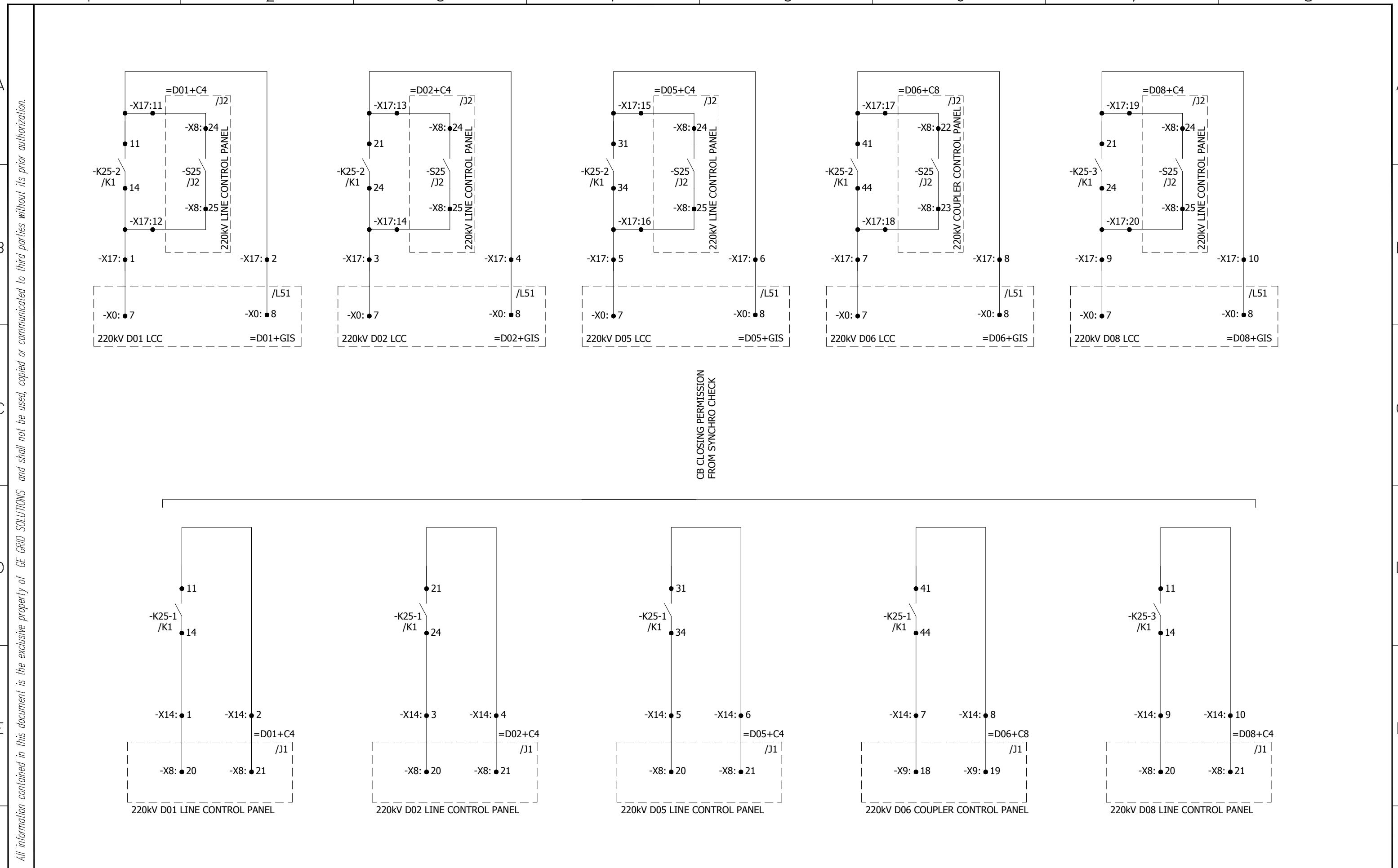
CIRCUIT



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0	AS BUILT	18.08.2018	MSC	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 GAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) COMMON ALARM SIGNALS	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type K3
									Sheet no. 22

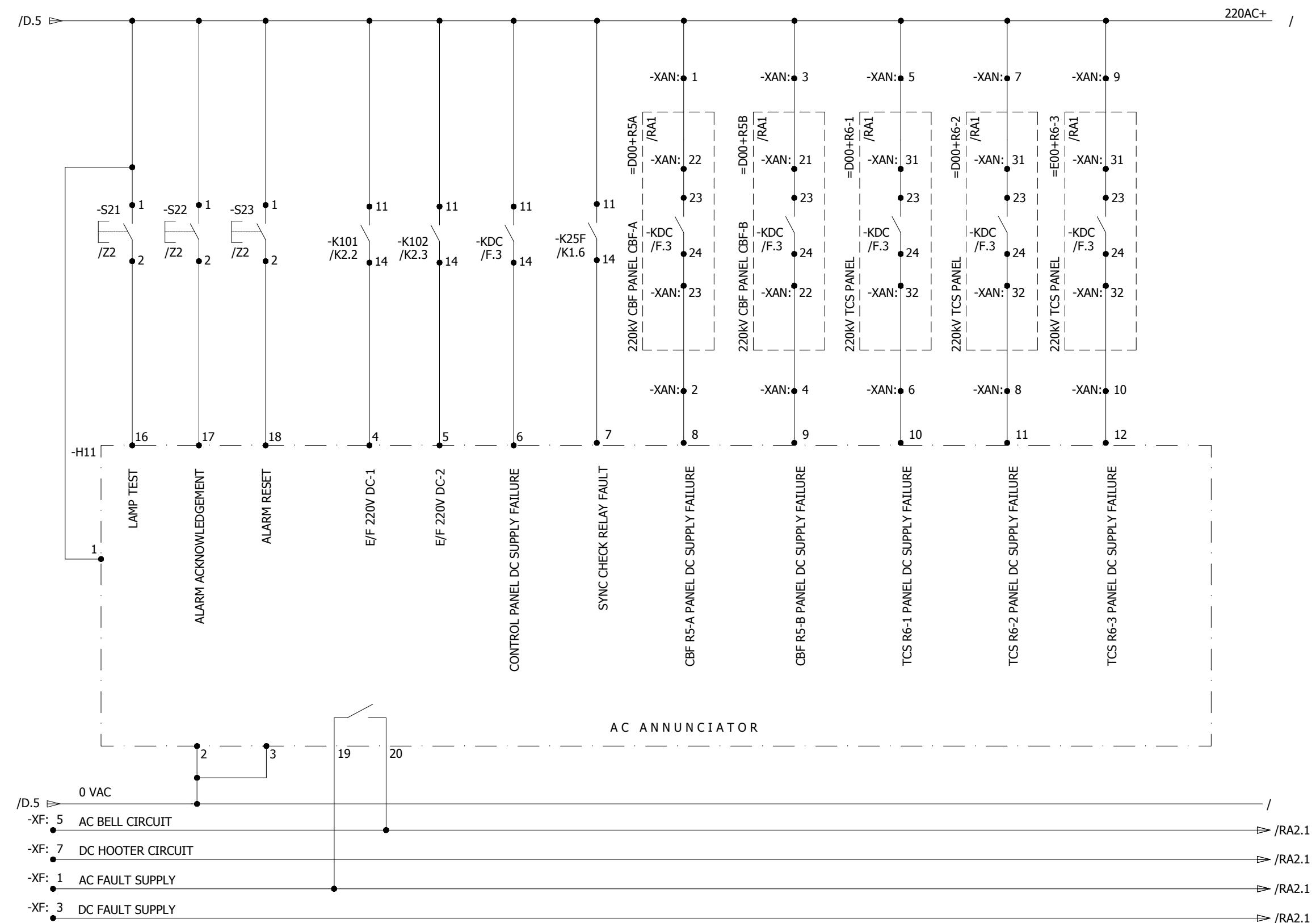
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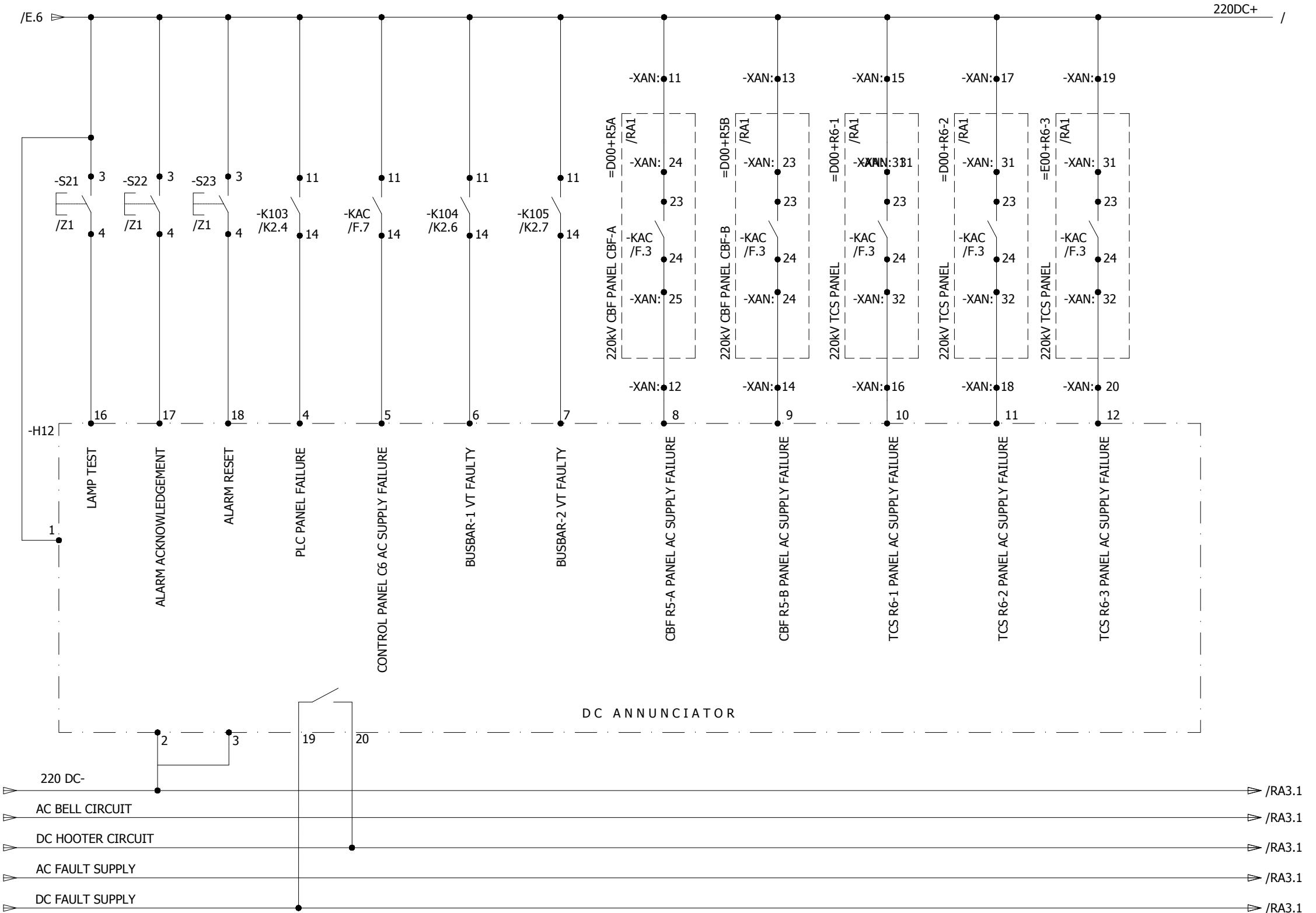
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type PA1	Sheet no. 23

## ANNUNCIATION CIRCUIT

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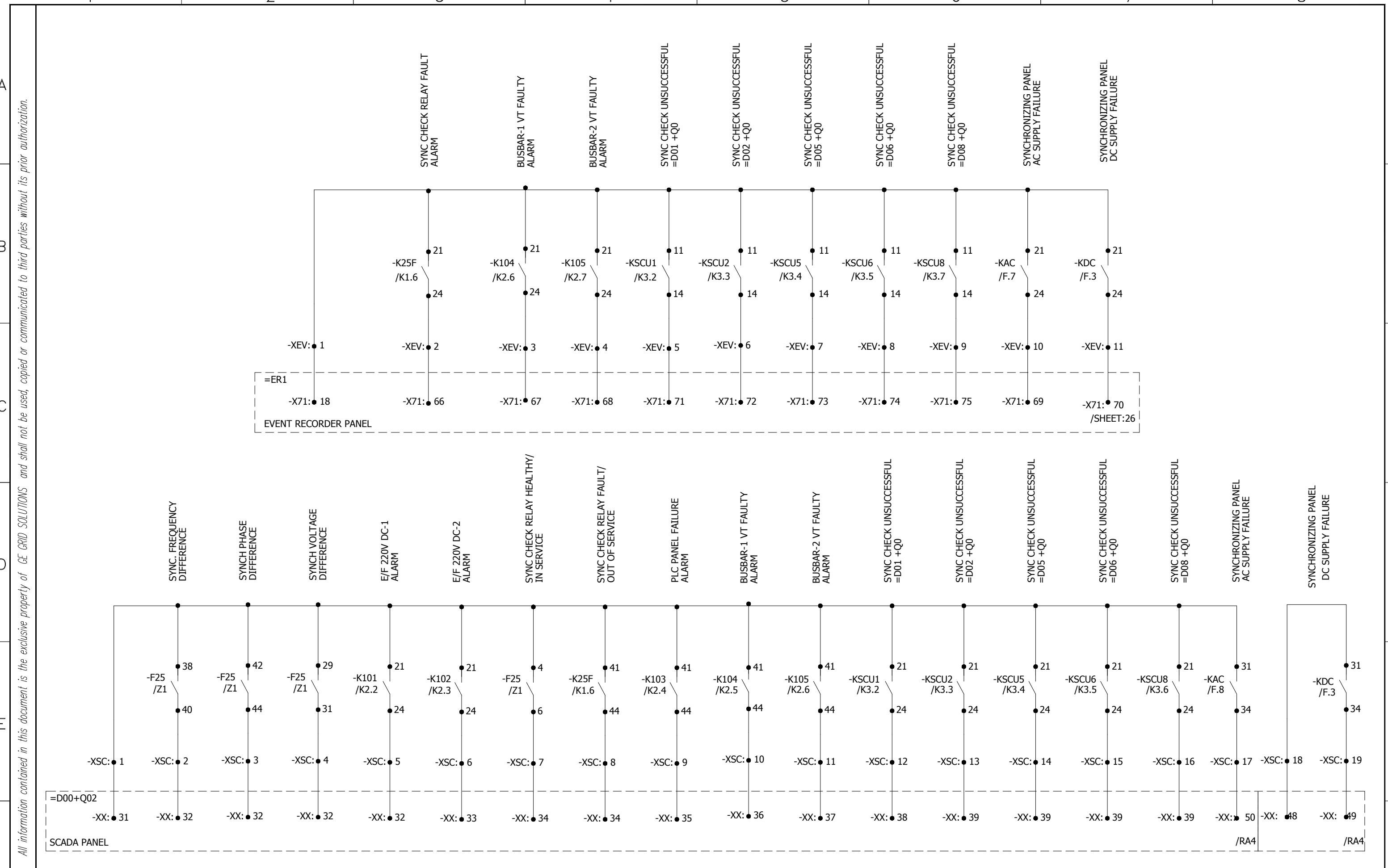


0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) AC ANNOUNCEMENTS	Drawing no. P60194-E-DSC-SC-001
	DESCRIPTION	DATE	DRAWER						Project no. P-60194
REV.									Sheet type RA1
									Sheet no. 24



0	AS BUILT	18.08.2018	MSC	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 SYNCHRONIZING PANEL (=D00+C6) DC ANNOUNCEMENTS	Drawing no. P60194-E-DSC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA2	Sheet no. 25

All information contained in this document is the exclusive property of GE GRID SOLUTIONS and shall not be used, copied or communicated to third parties without its prior authorization.	AC BELL		DC HOOTER		220kV LINE CONTROL PANEL																																	
	-B1		-H1		=D01+C4																																	
					/RA1																																	
B			C	D	E	F																																
C	<ul style="list-style-type: none"> <li>-XF: 5 AC BELL CIRCUIT</li> <li>-XF: 7 DC Hooter CIRCUIT</li> <li>-XF: 1 AC FAULT SUPPLY</li> <li>-XF: 3 DC FAULT SUPPLY</li> </ul>	<ul style="list-style-type: none"> <li>-XF: 6</li> <li>-XF: 8</li> <li>-XF: 2</li> <li>-XF: 4</li> </ul>	<ul style="list-style-type: none"> <li>-XF: 5</li> <li>-XF: 7</li> <li>-XF: 1</li> <li>-XF: 3</li> </ul>																																			
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0	AS BUILT	18.08.2018	MSC	Manufacturer	Contractor	Client	Project	Title	Drawing no.																													
				 EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	 Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	220kV SYNCHRONIZING PANEL (=D00+C6) AC ANNOUNCEMENTS	P60194-E-DSC-SC-001																													
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA2-1	Sheet no. 26																											
1	2	3	4	5	6	7	8																															



0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 75-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 GAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) SCADA CIRCUIT	Drawing no. P60194-E-DSC-SC-001		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA3	Sheet no. 27

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A

B

C

D

E

F

A

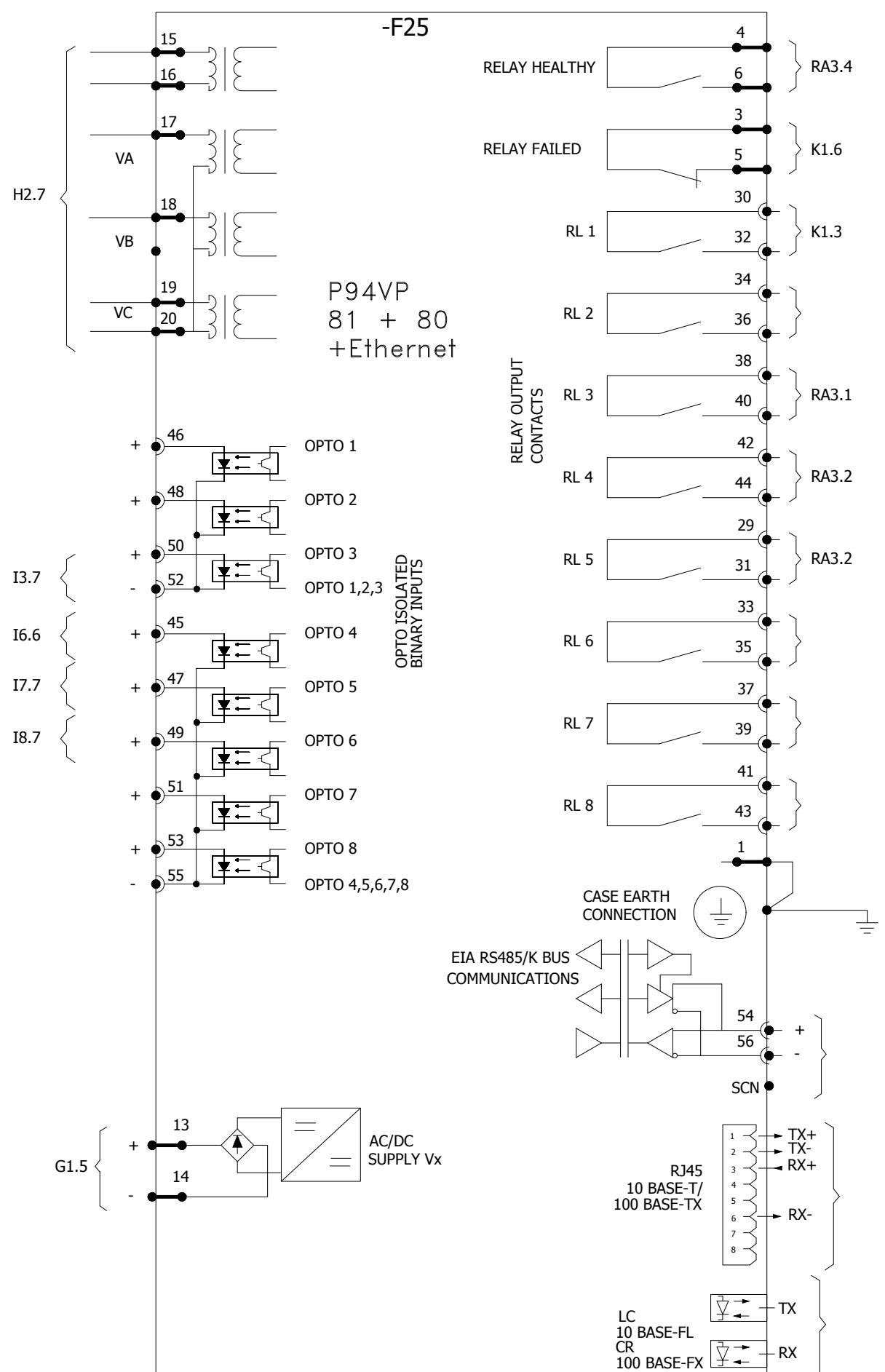
B

C

D

E

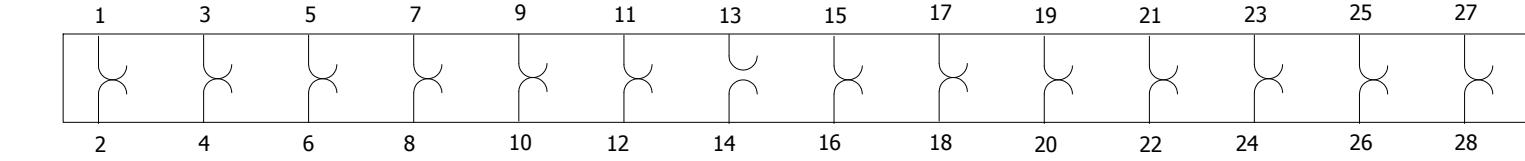
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0	AS BUILT	18.08.2018	MSC	Manufacturer <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>GE</b> Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 220kV SYNCHRONIZING PANEL (=D00+C6) COMPONENT DIAGRAM	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						
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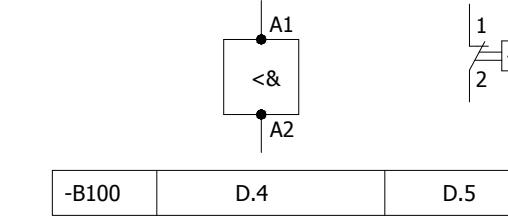
A



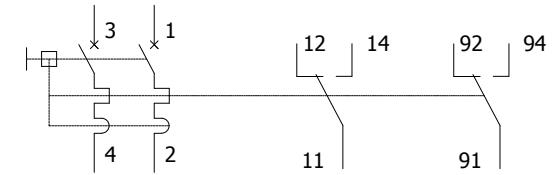
B

-XT25	H2.5	H2.5	G1.5	K1.3	K1.6	K3.4
-------	------	------	------	------	------	------

C



-B100	D.4	D.5
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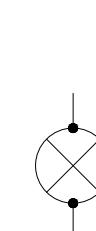


-F101	D.2	F.6	
-F102	D.4	F.6	
-F103	D.6	F.6	
-F104	D.6	F.2	
-F201	E.3	F.2	
-F202	E.4	F.2	
-F203	E.3	F.3	

D



-S6D	O1	-X100	D.7
------	----	-------	-----



-F101	D.2	F.6	
-F102	D.4	F.6	
-F103	D.6	F.6	
-F104	D.6	F.2	
-F201	E.3	F.2	
-F202	E.4	F.2	
-F203	E.3	F.3	

E



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



F

0	AS BUILT	18.08.2018	MSC	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 SYNCHRONIZING PANEL (=D00+C6) COMPONENT DIAGRAM	Drawing no. P60194-E-DSC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type Z2
									Sheet no. 29