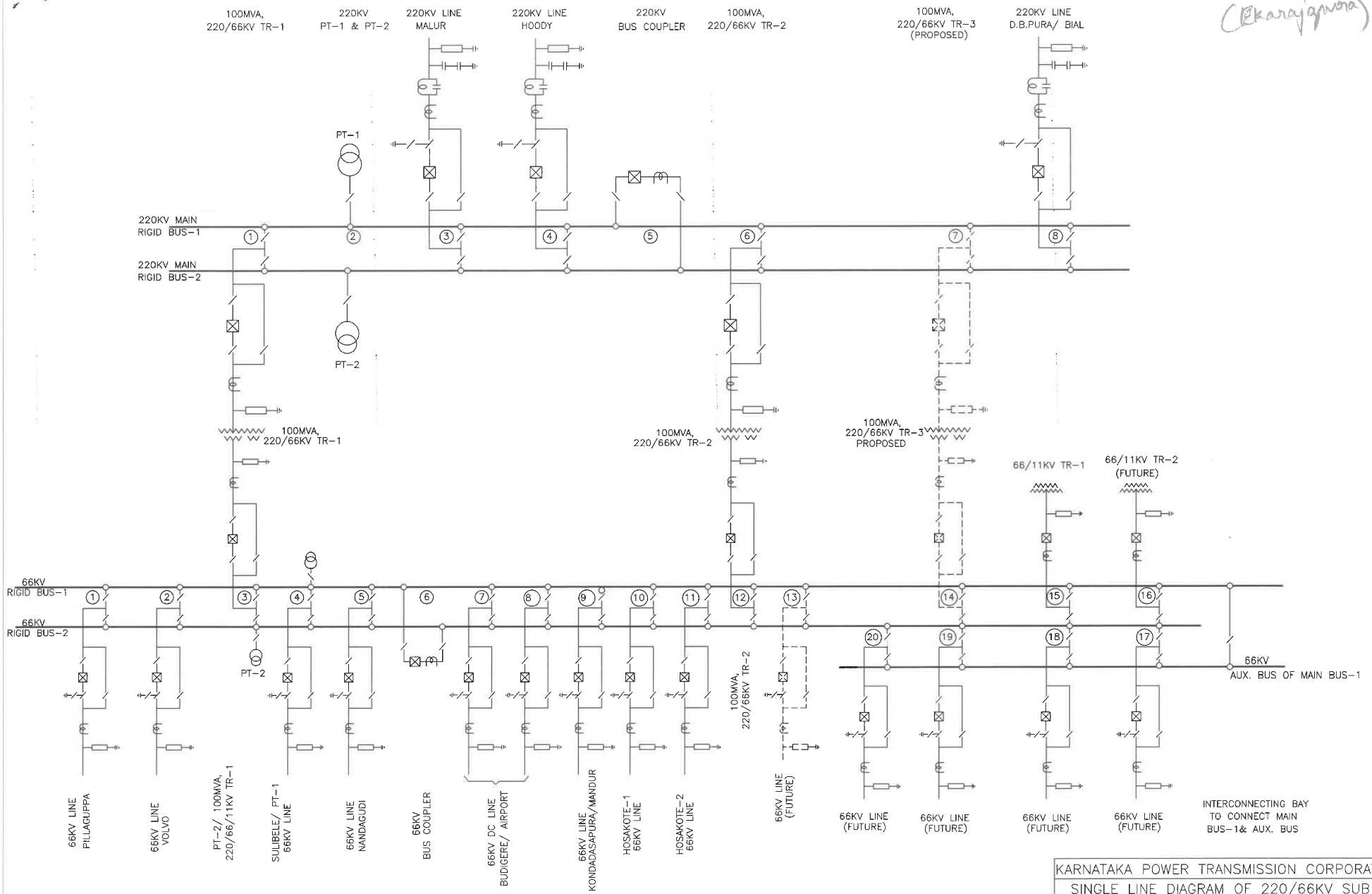
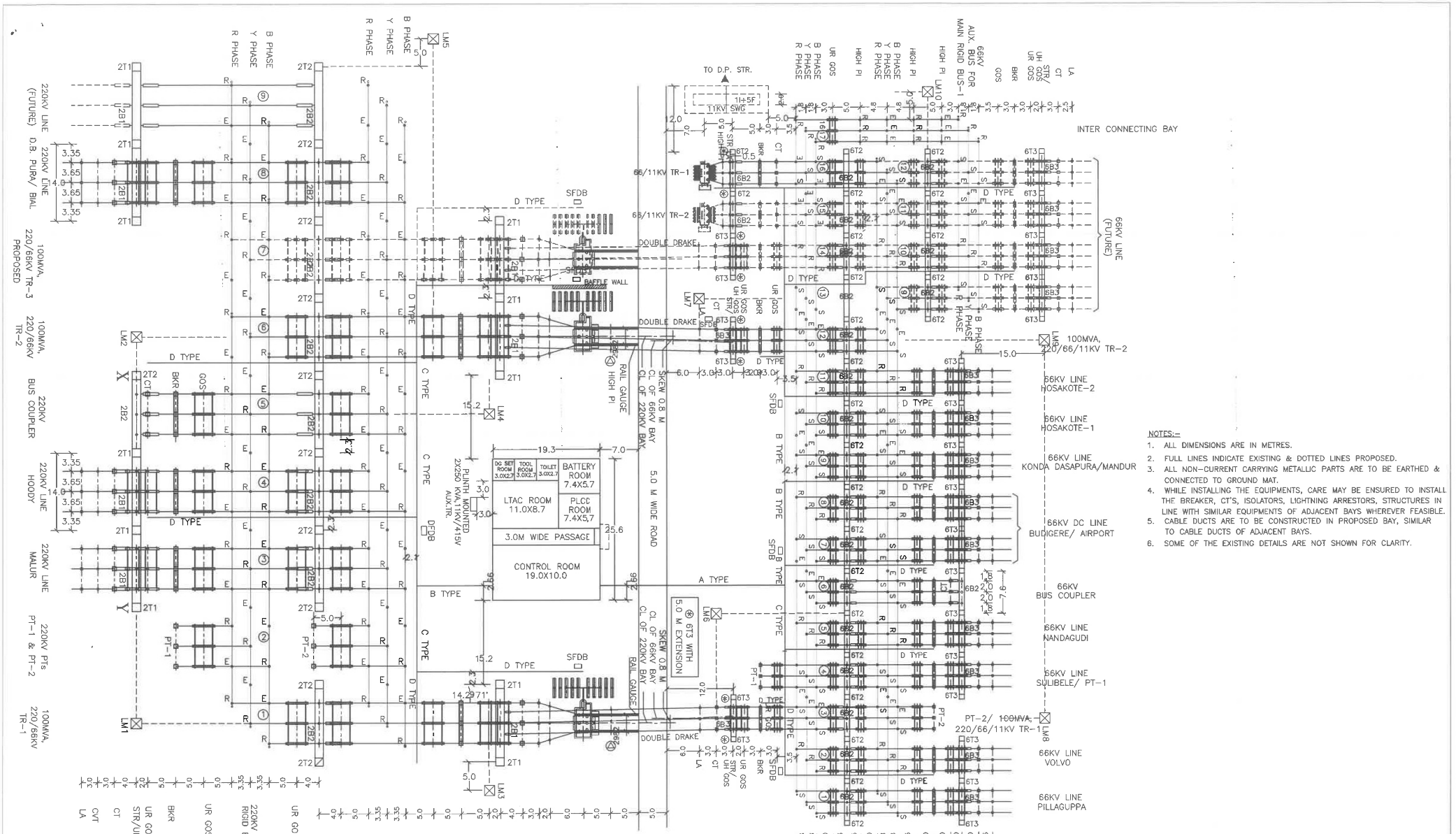
220KV Hosakote (Ekarajapura)



KARNATAKA POWER TRANSMISSION CORPORATION LIMITED				
SINGLE LINE DIAGRAM OF 220/66KV SUB STATION AT HOSKOTE				
DRG.NO.KPTL/TECH/SS-220/HKT-1/R2 DATE:-20.04.2017				SCALE :- N.T.S
LAKSHMI DEVI.G	A.E.E	E.E	S.E.E (TECH)	C.E.E (P&C)
DRN	CHD	SUB	REC	APPROVED



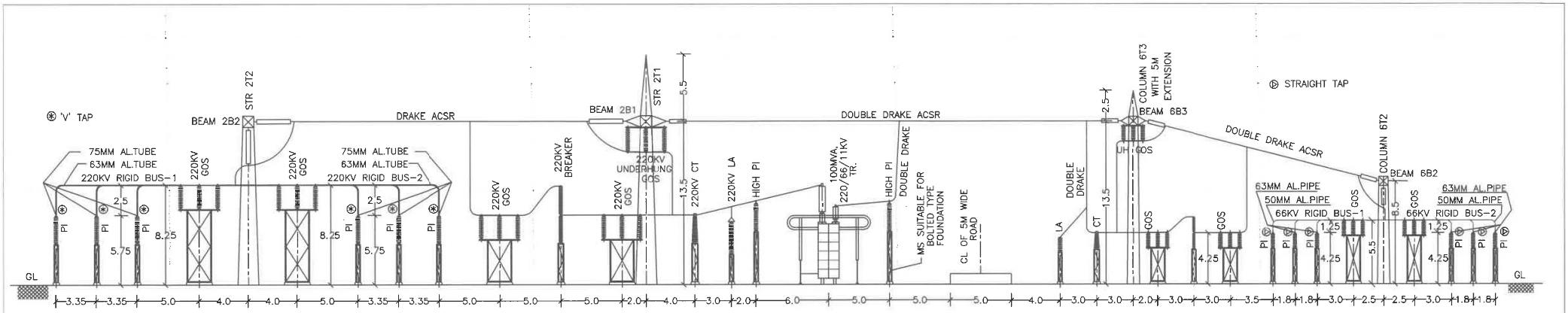
NOTES:-

1. ALL DIMENSIONS ARE IN METRES.
2. FULL LINES INDICATE EXISTING & DOTTED LINES PROPOSED.
3. ALL NON-CURRENT CARRYING METALLIC PARTS ARE TO BE EARTHED & CONNECTED TO GROUND MAT.
4. WHILE INSTALLING THE EQUIPMENTS, CARE MAY BE ENSURED TO INSTALL THE BREAKER, CT'S, ISOLATORS, LIGHTNING ARRESTORS, STRUCTURES IN LINE WITH SIMILAR EQUIPMENTS OF ADJACENT BAYS WHEREVER FEASIBLE.
5. CABLE DUCTS ARE TO BE CONSTRUCTED IN PROPOSED BAY, SIMILAR TO CABLE DUCTS OF ADJACENT BAYS.
6. SOME OF THE EXISTING DETAILS ARE NOT SHOWN FOR CLARITY.

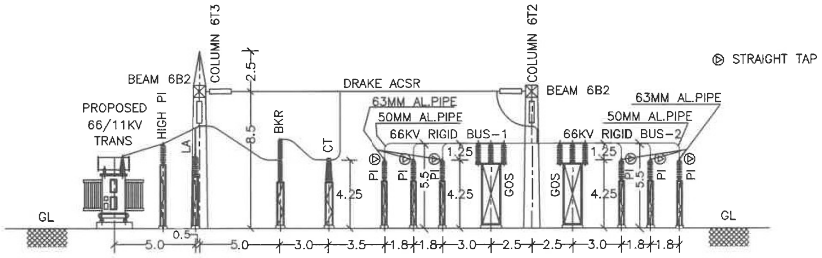
KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

DETAILED LAYOUT PLAN OF PROPOSED ADDITIONAL 220/66/11KV TR AND 66/11KV TR. BAY AT 220KV SUB STATION AT HOSKOTE, B'LORE

DRG. NO. KPTCL/TECH/SS-220/BNK-4/R2			DATED:-20.04.2017	SCALE :- N.T.S.
LAKSHMI DEVI.G	A.E.E	E.E	S.E.E (TECH)	C.E.E (P&C)
DRN	CHD	SUB	REC	APPROVED



CROSS SECTION THROUGH 100MVA, 220/66KV TRANSFORMER BAY



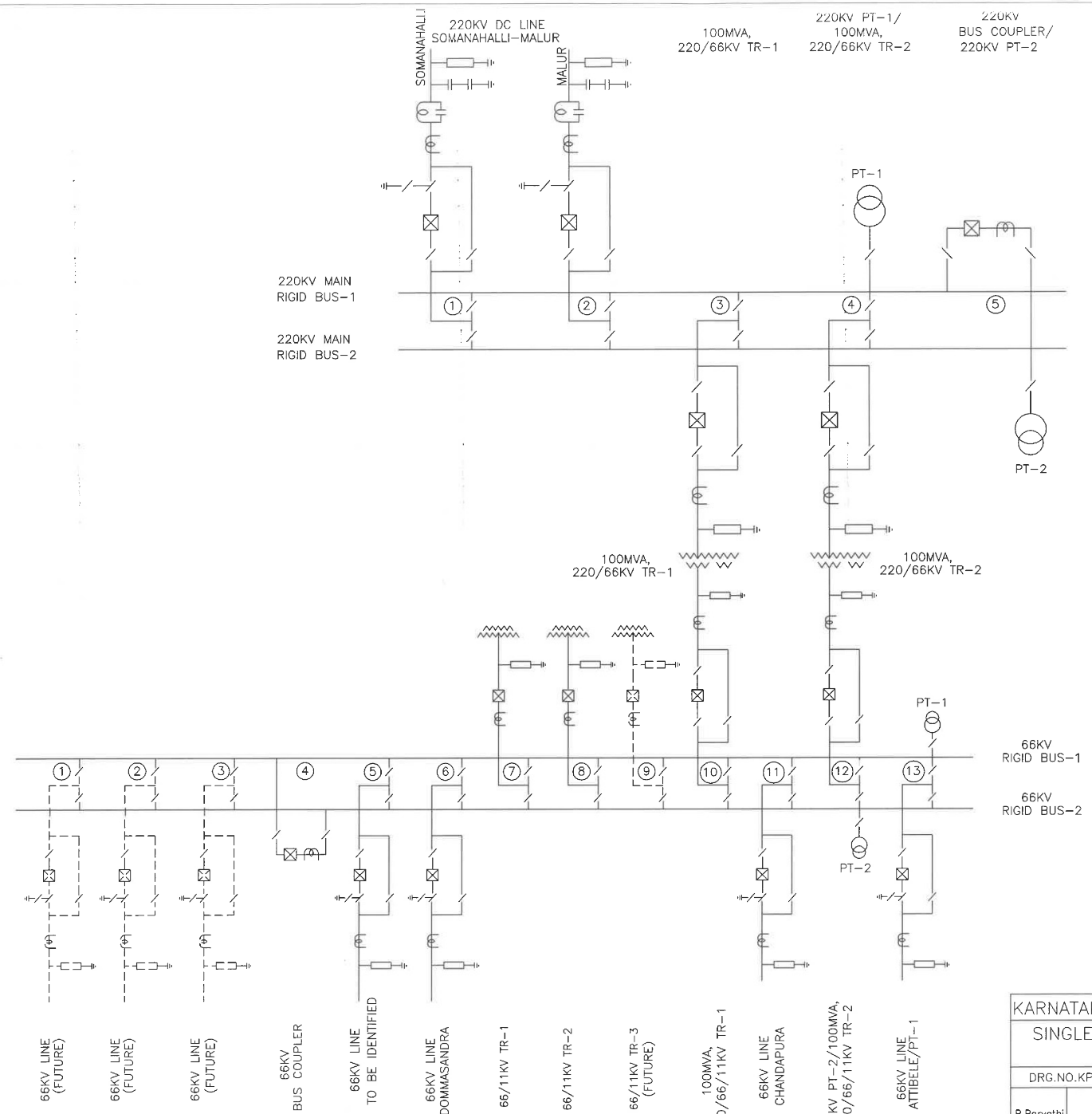
CROSS SECTION THROUGH 66/11KV TRANSFORMER BAY

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

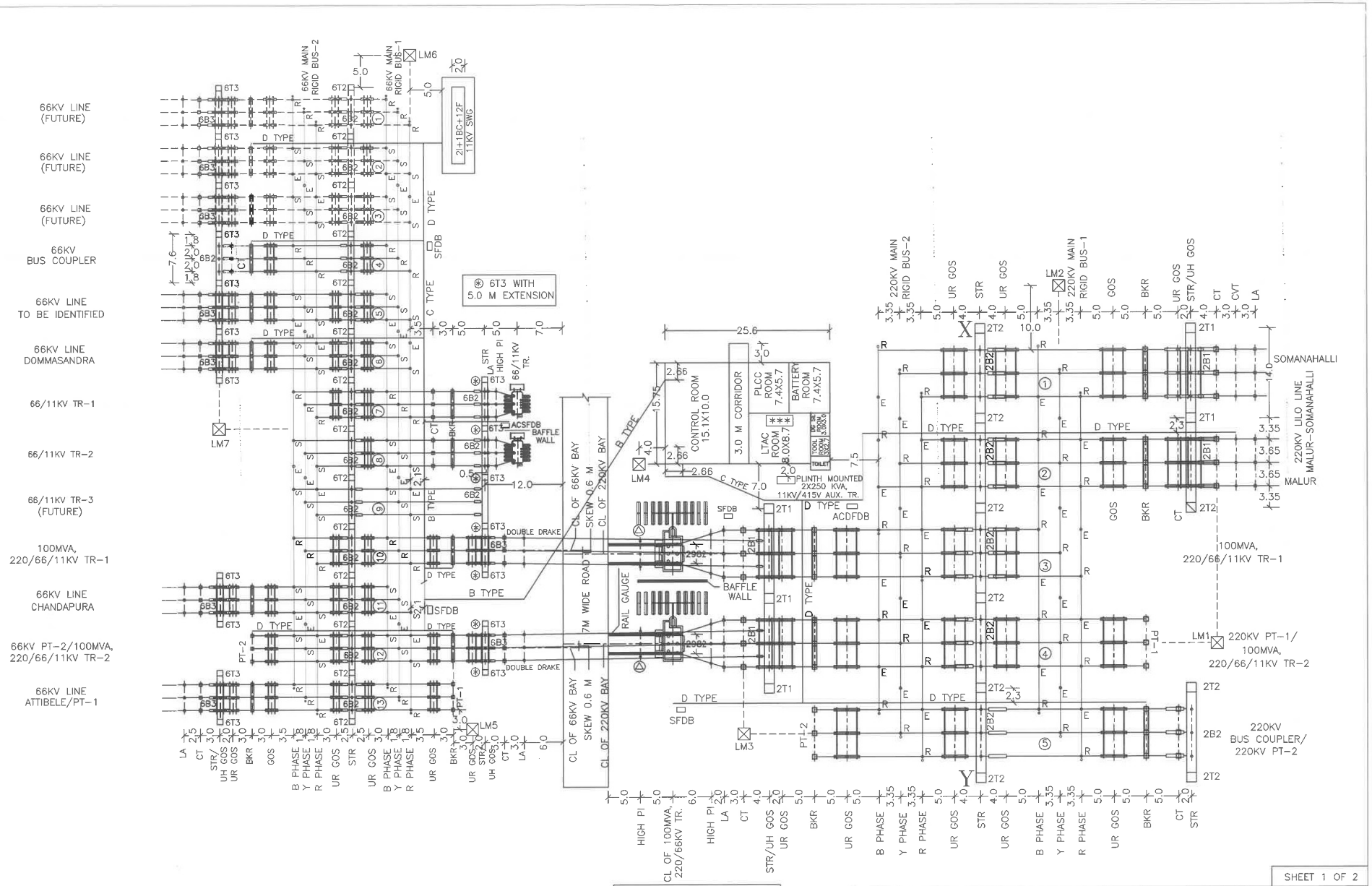
CROSS SECTION THROUGH ADDTIONAL 220/66/11KV TR. & 66/11KV TR. BAY AT 220KV SUB-STATION AT HOSKOTE,BANGALORE

DRG. NO. KPTCL/SS-220/ BNK-5/R2	DATE:- 20.04.2017			SCALE:- NTS
LAKSHMI DEVI.G	A.E.E	E.E	S.E (TECH)	C.E.E (P&C)
DRN	CHD	SUB	REC	APPROVED

220KV Sarjapura



KARNATAKA POWER TRANSMISSION CORPORATION LIMITED				
SINGLE LINE DIAGRAM OF 220/66KV SUB STATION AT SARJAPURA				
DRG.NO.KPTL/TECH/SS–220/SJP–1		DATED:– 25.5.06		SCALE :– N.T.S
P.Parvathi	A.E.E	E.E	S.E.E (TECH)	C.E.E (P&C)
DRN	CHD	SUB	REC	APPROVED

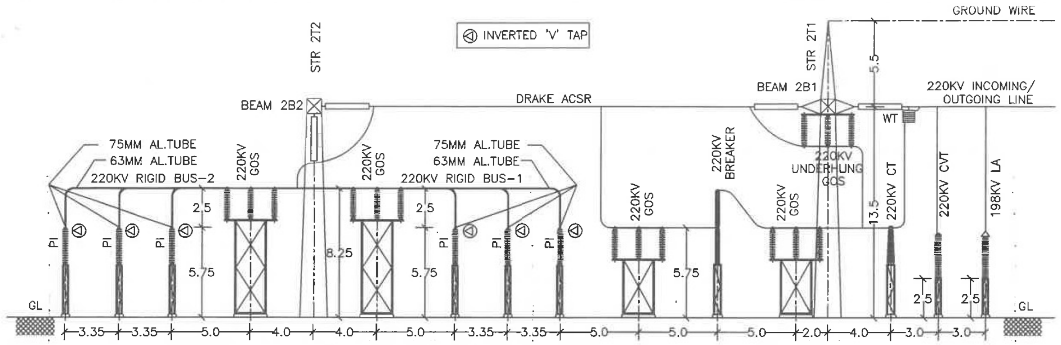


SHEET 1 OF 2

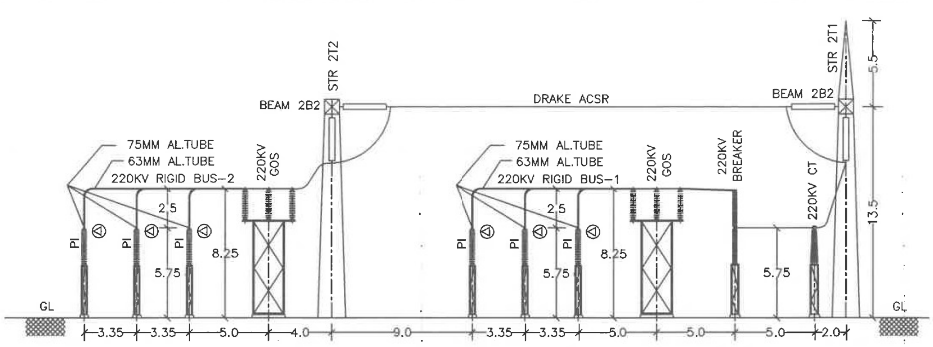
KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

DETAILED LAYOUT PLAN OF PROPOSED 220/66/11KV SUB STATION AT SARJAPURA

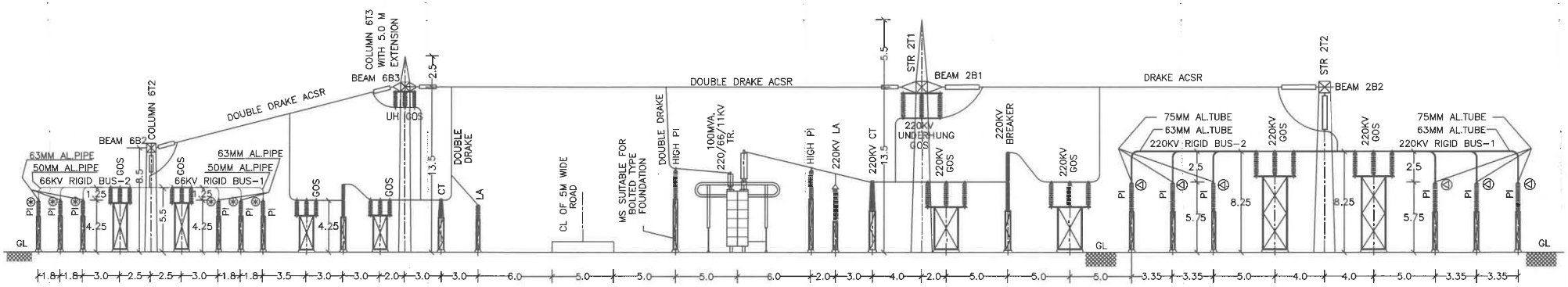
DRG. NO. KPTCL/ TECH/ SS-220/SJP-4		DATED:- 25.5.06		SCALE :- N.T.S.
P.Parvathi	A.E.E	E.E	S.E.E (TECH)	C.E.E (P&C)
DRN	CHD	SUB	REC	APPROVED



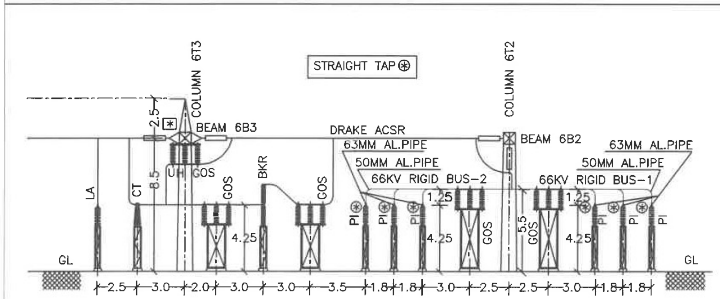
CROSS SECTION THROUGH 220KV LINE BAY



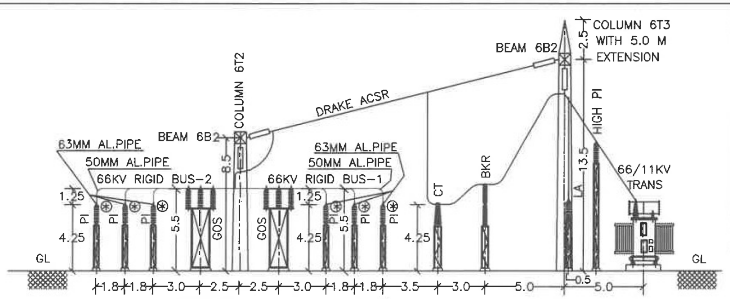
CROSS SECTION THROUGH 220KV BUS COUPLER BAY



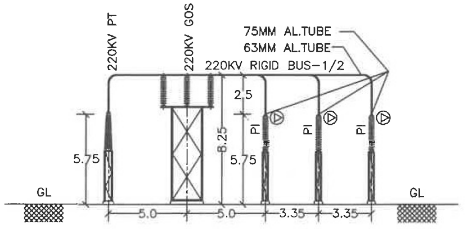
CROSS SECTION THROUGH 100MVA, 220/66KV TRANSFORMER BAY



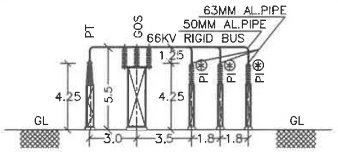
CROSS SECTION THROUGH 66KV LINE BAY



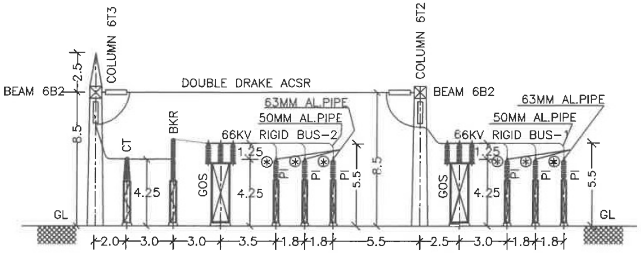
CROSS SECTION THROUGH 66/11KV TRANSFORMER BAY



CROSS SECTION THROUGH 220KV PT BAY



CROSS SECTION THROUGH 66KV PT BAY



CROSS SECTION THROUGH 66KV BUS COUPLER BAY

NOTE:-
ALL DIMENSIONS ARE IN METRES.

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

CROSS SECTION THROUGH VARIOUS 220 & 66KV BAYS AT 220KV STATION, SARJAPURA USING RIGID TYPE MAIN BUS

DRG. NO. KPTCL/SS-220/ SJP-5 DATE:- 25.5.06 | SCALE:- N.T.S

P.Parvathi	A.E.E	E.E	S.E (TECH)	C.E.E (P&C)
DRN	CHD	SUB	REC	APPROVED

REVISED EARTHMAT FOR THE PROPOSED 220 KV STATION @ HOSKOTE,BAGALORE RURAL DISTRICT.

IMPORTANT

* NOT TO SCALE

* THE NO OF CAST IRON PIPE ELECTRODES SHALL BE PROVIDED AS PER GUIDELINES (ITEM 2, 4, 5 & 12 OF GUIDELINES)

* BEFORE EXECUTION PLEASE CAREFULLY GO THROUGH THE ENCLOSED GUIDELINES *

* ALL DIMENSIONS ARE IN METER

SALIENT DESIGN FEATURES

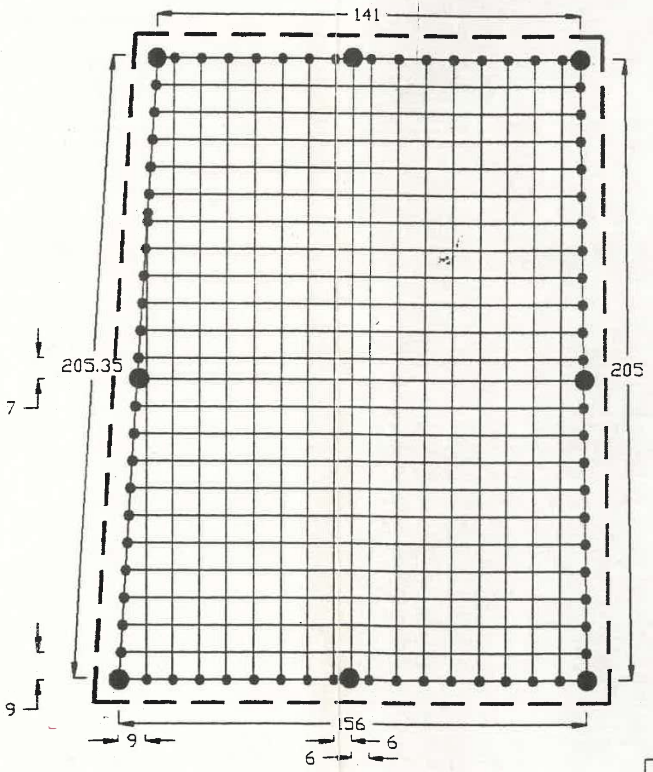
AREA COVERED BY EARTHMAT IN SQ MTR	30443
DEPTH OF BURIAL OF EARTHMAT IN MTR	0.9
SPACING BETWEEN MAT CONDUCTOR (M.S. FLAT) IN MTR	9
SIZE OF EARTHMAT CONDUCTOR (M.S.FLAT) IN MM	50 X 6 MM

SPREADING OF GRANITE METAL JELLY OF SIZE 20/25 MM TO A HEIGHT OF 100 MM OVER THE EQUIPMENT BAYS ONLY.

BILL OF MATERIALS (APPROXIMATE QUANTITY) FOR EARTHMAT FORMATION & FENCING.

(AS PER THE LAYOUT DRAWING NO.DRAWING ENCLOSED TO ABOVE REFERENCE)

1.Excavation,formation,refilling	3658	Cmtr.
2.Material for formation of earthmat as per specification		
a)M.S.Flat 50 X 6 MM	8210	Mtr.
b)MS Round rods 25 mm dia,1.05 Mt. long	74	No.
c)G.I.Flats 50 X 6 MM for earth connection	9809	Mtr.
d)Cast iron pipe electrodes of 100 mm Id,13 mm thick,2.75 mtr.long	101	No.
e)Spreading of Granite metal jelly of size 20/25 mm size to a height of 100 mm	Equip.Bays only	



— — FENCE SHALL BE AT A MINIMUM DISTANCE OF 1.5 METERS AWAY FROM THE PERIPHERY OF THE STATION EARTHMAT

• 25 MM DIA M.S. ROUND RODS OF LENGTH ONE METER TO BE DRIVEN AS SHOWN

● ADDITIONAL C.I.PIPE ELECTRODES PROPOSED (REF.ENCLOSED SKETCH)

REVISION-1 Dtd. 8-10-2007	SUPERCEEDES EARLIER DESIGN SENT VIDE LETTER NO SEE/R&D/F-4(1)/810-13/DTD:06-05-2006

R & D CENTRE, K P T C L

DRG NO. SEE/R&D/F4 (1) Dtd. 8-10-2007

AEEE	EEE	SEE
8/10/07	8/10/07	9/10/7

EARTHMAT FOR THE PROPOSED 220 KV STATION @ SARJAPURA,BANGALORE (RURAL) DISTRICT.

IMPORTANT

* NOT TO SCALE

* THE NO OF CAST IRON PIPE ELECTRODES SHALL BE PROVIDED AS PER GUIDELINES (ITEM 2, 4, 5 & 12 OF GUIDELINES)

* BEFORE EXECUTION PLEASE CAREFULLY GO THROUGH THE ENCLOSED GUIDELINES *

* ALL DIMENSIONS ARE IN METER

SALIENT DESIGN FEATURES

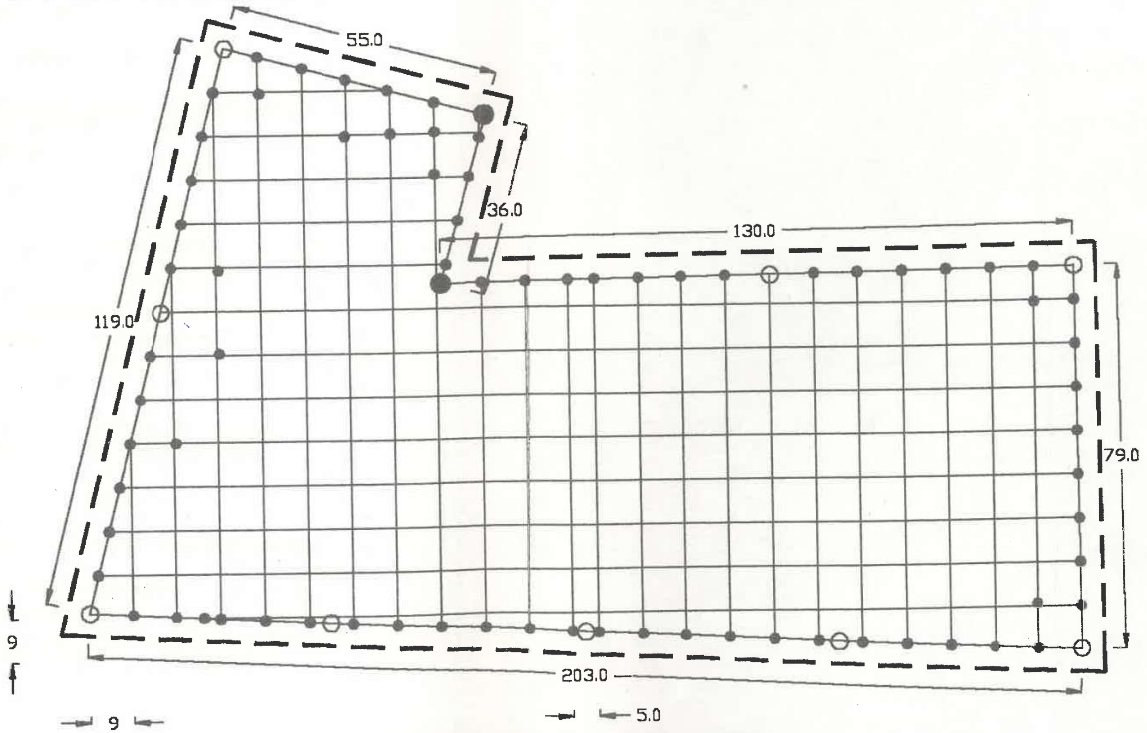
AREA COVERED BY EARTHMAT IN SQ MTR	16430
DEPTH OF BURIAL OF EARTHMAT IN MTR	0.9
SPACING BETWEEN MAT CONDUCTOR (M.S. FLAT) IN MTR	9
SIZE OF EARTHMAT CONDUCTOR (M.S.FLAT) IN MM	50 X 8 MM

SPREADING OF GRANITE METAL JELLY OF SIZE 20/25 MM TO A HEIGHT OF 100 MM OVER THE ENTIRE EARTH MAT AREA.

BILL OF MATERIALS (APPROXIMATE QUANTITY) FOR EARTHMAT FORMATION & FENCING.

(AS PER THE LAYOUT DRAWING NO.KPTCL/TECH/SS-220/S-JP/25-5-06)

1.Excavation,formation,refilling	2131	Cmtr.
2.Material for formation of earthmat as per specification		
a)M.S.Flat 50 X 8 MM	4782	Mtr.
b)MS Round rods 25 mm dia,1.05 Mt. long	74	No.
c)G.I.Flats 50 X 8 MM for earth connection	7200	Mtr.
d)Cast iron pipe electrodes of 100 mm Id,13 mm thick,2.75 mtr.long	90	No.
e)Spreading of Granite metal jelly of size 20/25 mm size to a height of 100 mm	1643	Cmtr.
f) 40mm dia,10Mtrs long M.S.Round Rods as Deepbore Electrodes.	9	No.



— — FENCE SHALL BE AT A MINIMUM DISTANCE OF 1.5 METERS AWAY FROM THE PERIPHERY OF THE STATION EARTHMAT

• 25 MM DIA M.S. ROUND RODS OF LENGTH ONE METER TO BE DRIVEN AS SHOWN

● ADDITIONAL C.I.PIPE ELECTRODES PROPOSED (REF.ENCLOSED SKETCH)

○ PROPOSED 40mm DIA,10 Mtrs LONG M.S.ROUND RODS AS DEEPBORE ELECTRODE WITH BENTONITE TREATMENT.

R & D CENTRE, K P T C L		
DRG NO. SEE/R&D/F9 (8) Dtd. 13-6-2006		
AEEE	EEE	SEE

O/C

© 2023 Hitachi Energy. All rights reserved.

CUSTOMER	:	POWER GRID CORPORATION OF INDIA LTD.
CUSTOMER REF. PO.NO	:	GEM/2022/B/2635950 Dated.17.03.2023
HE REF.NO	:	3100137898 , IN-56323017
SUBSTATION	:	400/220kV KOLAR SUBSTATION
EQUIPMENT	:	400kV BUSBAR PROTECTION RETROFITTING
DRAWING REF.	:	General Arrangement : 1MNS801837-AGCA
		Schematic Drawings : 1MNS801837-CGCA
STANDARD BAY REF.	:	=4R

IN CONTINUATION WITH EXISTING SCHEME YN1M300439-CZA

AUX. D.C. VOLTAGE : 220VDC
AUX. A.C. VOLTAGE : 230VAC

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY
Title page

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 1
No.sheets 161
Doc. no. 1MNS801837-AGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
1	2	RETROFIT OF REB670 RELAY	TITLE PAGE	01	REVISED AS PER CUSTOMER COMMENTS
2	3	LIST OF CONTENTS	1 - 74	01	REVISED AS PER CUSTOMER COMMENTS
3	4	LIST OF CONTENTS	75 - 132	01	REVISED AS PER CUSTOMER COMMENTS
4	21	LIST OF CONTENTS	133 - 175	01	REVISED AS PER CUSTOMER COMMENTS
21	22	LIST OF SYMBOLS	LIST OF SYMBOLS	01	REVISED AS PER CUSTOMER COMMENTS
22	23	RETROFIT OF REB670 RELAY	SLD	01	REVISED AS PER CUSTOMER COMMENTS
23	24	RETROFIT OF REB670 RELAY	SLD	01	REVISED AS PER CUSTOMER COMMENTS
24	25	RETROFIT OF REB670 RELAY	SLD	01	REVISED AS PER CUSTOMER COMMENTS
25	26	RETROFIT OF REB670 RELAY	BB & LBB OPTD LOGIC	01	REVISED AS PER CUSTOMER COMMENTS
26	27	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
27	28	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
28	29	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
29	30	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
30	31	RETROFIT OF REB670 RELAY	M1-BUS 1 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
31	32	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
32	33	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
33	34	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
34	35	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
35	36	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
36	37	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
37	38	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
38	39	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
39	40	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
40	41	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
41	42	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
42	43	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
43	44	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
44	45	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
45	46	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
46	47	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
47	48	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
48	49	RETROFIT OF REB670 RELAY	M1-BUS 2 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
49	50	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
50	51	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
51	52	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
52	53	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
53	54	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
54	55	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
55	56	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
56	57	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
57	58	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
58	59	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
59	60	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
60	61	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
61	62	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
62	63	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
63	64	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
64	65	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
65	66	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
66	67	RETROFIT OF REB670 RELAY	M1-BUS 3 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
67	68	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
68	69	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
69	70	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
70	71	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
71	72	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
72	73	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
73	74	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
74	75	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS

Based on 3100135063

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
LIST OF CONTENTS

HITACHI Hitachi Energy India Limited

Doc. kind. LIST OF CONTENTS
DCC EAB
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-AGCA
Sheet 2
n. sheet 3

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
75	76	M1-BUS 3 BINARY OUTPUTS	M1-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
76	77	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
77	78	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
78	79	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
79	80	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
80	81	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
81	82	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
82	83	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
83	84	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
84	85	RETROFIT OF REB670 RELAY	M1-BUS 4 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
85	86	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
86	87	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
87	88	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
88	89	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
89	90	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
90	91	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
91	92	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
92	93	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
93	94	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
94	95	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
95	96	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
96	97	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
97	98	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
98	99	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
99	100	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
100	101	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
101	102	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
102	103	RETROFIT OF REB670 RELAY	M2-BUS 1 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
103	104	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
104	105	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
105	106	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
106	107	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
107	108	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
108	109	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
109	110	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
110	111	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
111	112	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
112	113	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
113	114	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
114	115	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
115	116	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
116	117	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
117	118	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
118	119	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
119	120	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
120	121	RETROFIT OF REB670 RELAY	M2-BUS 2 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
121	122	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
122	123	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
123	124	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
124	125	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
125	126	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
126	127	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
127	128	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
128	129	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
129	130	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
130	131	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
131	132	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
132	133	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS

Based on 3100135063

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
LIST OF CONTENTS

HITACHI Hitachi Energy India Limited

Doc. kind. LIST OF CONTENTS
DCC EAB
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-AGCA
Sheet 3
n. sheet 4

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
133	134	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
134	135	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
135	136	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
136	137	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
137	138	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
138	139	RETROFIT OF REB670 RELAY	M2-BUS 3 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
139	140	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
140	141	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
141	142	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
142	143	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
143	144	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
144	145	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
145	146	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
146	147	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
147	148	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
148	149	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
149	150	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
150	151	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
151	152	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
152	153	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
153	154	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
154	155	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
155	156	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
156	157	RETROFIT OF REB670 RELAY	M2-BUS 4 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
157	158	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
158	159	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
159	160	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
160	161	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
161	162	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
162	163	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
163	164	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
164	165	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
165	166	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
166	167	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
167	168	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
168	169	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
169	170	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
170	171	RETROFIT OF REB670 RELAY	96A OPTD	01	REVISED AS PER CUSTOMER COMMENTS
171	172	RETROFIT OF REB670 RELAY	96B OPTD	01	REVISED AS PER CUSTOMER COMMENTS
172	173	RETROFIT OF REB670 RELAY	ANNUCIATION CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
173	173.1	RETROFIT OF REB670 RELAY	ANNUCIATION CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
173.1	173.2	RETROFIT OF REB670 RELAY	ANNUNCIATOR CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS
173.2	174	RETROFIT OF REB670 RELAY	ANNUNCIATOR CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS
174	175	RETROFIT OF REB670 RELAY	EVENT LOGGER CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS
175		RETROFIT OF REB670 RELAY	EVENT LOGGER CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
LIST OF CONTENTS

HITACHI Hitachi Energy India Limited

Doc. kind. LIST OF CONTENTS
DCC EAB
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-AGCA
Sheet 4
n. sheet 21

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

TERMINAL BLOCK DESIGNATION FOR EXTERNAL WIRING

X01	CT CIRCUITS
X02	CVT/PT CIRCUITS
DCX03, ACX03	DC/AC INCOMING CIRCUITS
X04	CONTROL CIRCUITS
X05	INDICATION CIRCUITS
X06	ANNUNCIATION CIRCUITS
X07	SPARE CONTACTS
X08	SCADA/DAS/EVENT LOGGER CKTS
52*X04	CB CIRCUITS
89*X04	ISOLATOR CIRCUITS
BBX04	BUSBAR CIRCUIT
TRX04	TRANSFORMER TROUBLE/ RTCC/FIRE FIGHTING
PLX04	PLCC CIRCUIT
AXX1.1,AXX1.2, BXX1.1,BXX1.2	DC CIRCUITS FOR LOOPING

TERMINAL BLOCK DESIGNATION FOR INTERPANEL BUS WIRING

AX11,BX11 CX11,DX11	CT CIRCUITS
AX12,BX12 CX12,DX12	CVT CIRCUITS
DCX13, ACX13	DC/AC INCOMING CIRCUITS
X14	CONTROL CIRCUITS
BBX14	BUSBAR CIRCUIT

TERMINAL BLOCKS

	NON DISCONNECTING TB
	DIS CONNECTING TB
	CT/CVT JUNCTION BOX TERMINAL
	BREAKER TERMINAL
	ISOLATOR TERMINAL
	MARSHALLING KIOSK TB
	PLCC/FOTE TERMINALS
	ACDB/DCDB TERMINALS

SYMBOL LIST

	MCB
	FUSE
	LINK
	RELAY COIL
	RELAY REVERSE FLAG
	RELAY MANUAL RESET FLAG
	PUSH BUTTON ON CONTACT
	NO CONTACT
	NC CONTACT
	EARTH
	SWITCH CONTACT
	LED LAMP
	SPACE HEATER
	DIODE
	RESISTOR
	VARISTOR

SYMBOL LIST

	BINARY INPUT
	BINARY OUTPUT
	CHANGE OVER OUTPUT
	CT/PT INPUT
	mA INPUT
	POWER SUPPLY INPUT
	FO COMM. PORT
	RS232/485 COMM. PORT
	RJ45 COMM. PORT
	CURRENT TRANSFORMER
1 2 3	CVT
1 2 3	PT
P M	CIRCUIT BREAKER
S M	ISOLATOR EARTH SWITCH
	TRANSFORMER
	REACTOR/WAVE TRAP
	LIGHNING ARRESTOR

FERRULE NOMENCLATURE

FERRULE 'A' : CT CIRCUIT- MAIN PROTECTION
FERRULE 'B' : CT CIRCUIT- BUSBAR PROTECTION
FERRULE 'C' : CT CIRCUIT- BACKUP PROTECTION
FERRULE 'D' : CT CIRCUIT- METERING
FERRULE 'E' : PT CKTS
FERRULE 'H' : AUXILLARY AC CKTS
FERRULE 'J' : AUXILLARY DC CKTS
FERRULE 'K' : CONTROL CKTS
FERRULE 'L' : INDICATION CKTS
FERRULE 'P' : DC CKT- BUSBAR PROTECTION
FERRULE 'U' : SPARE CONTACTS

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

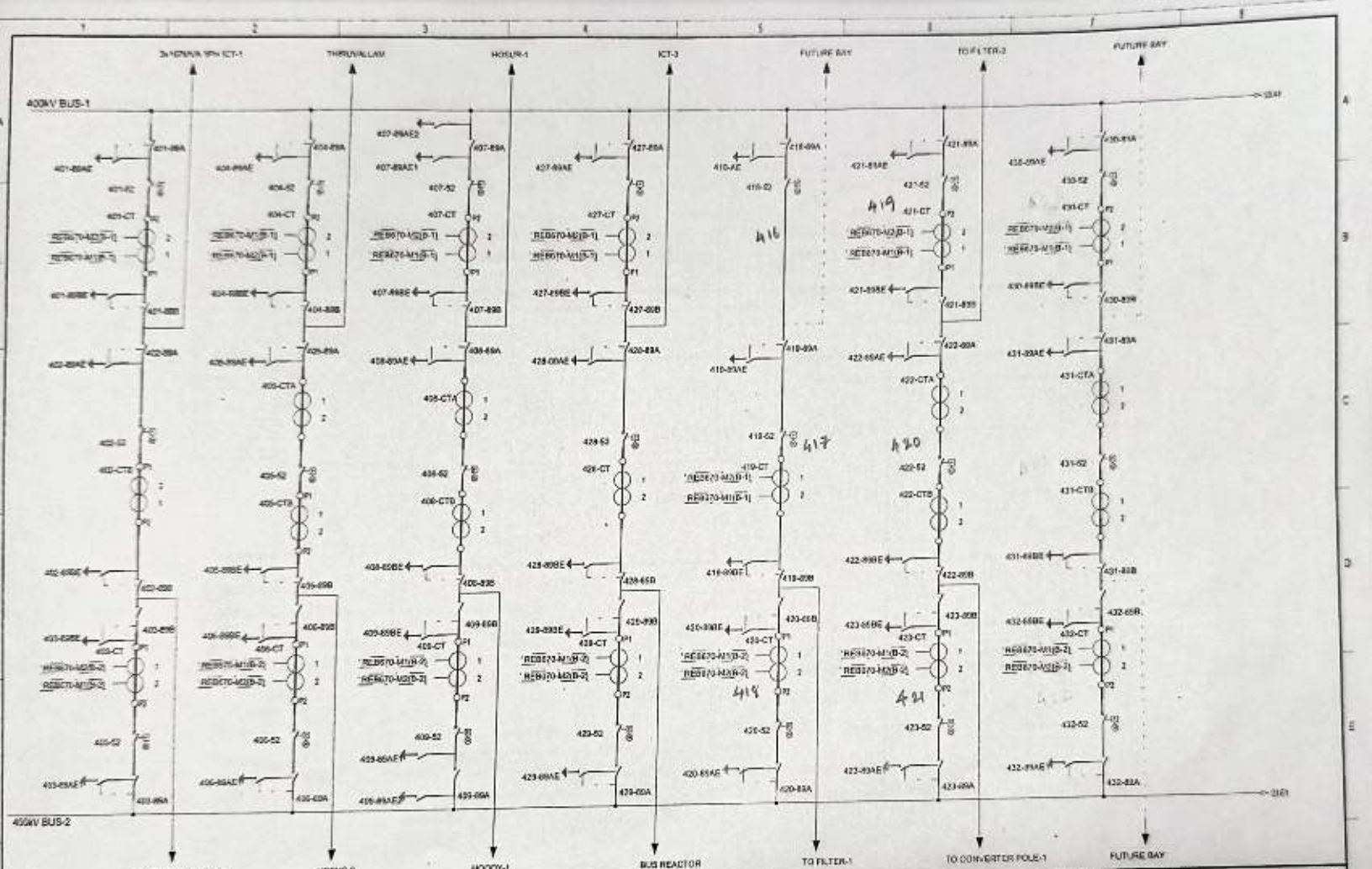
Title 400kV BUSBAR PROTECTION
LIST OF SYMBOLS
LIST OF SYMBOLS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 21
n. sheet 22

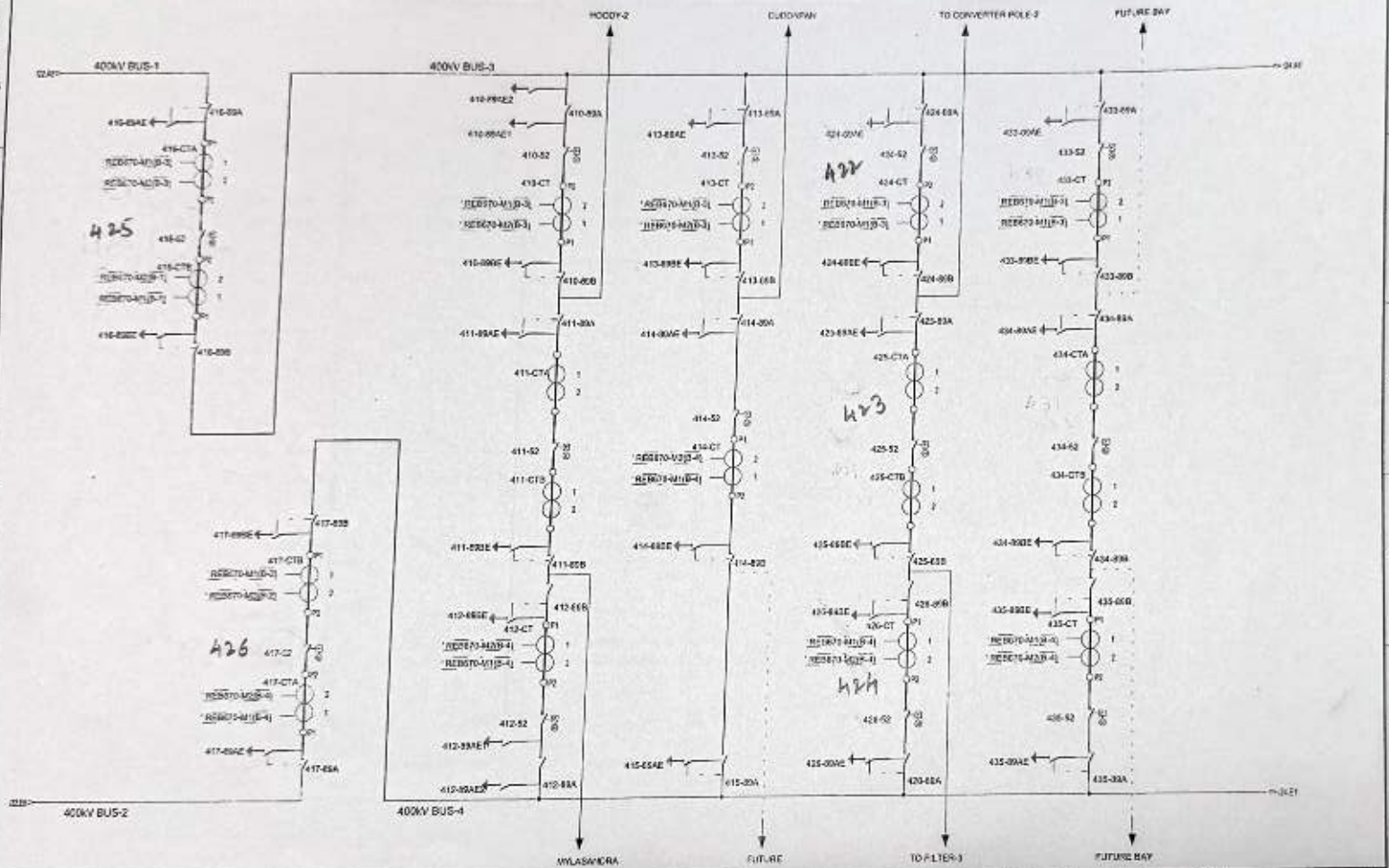
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



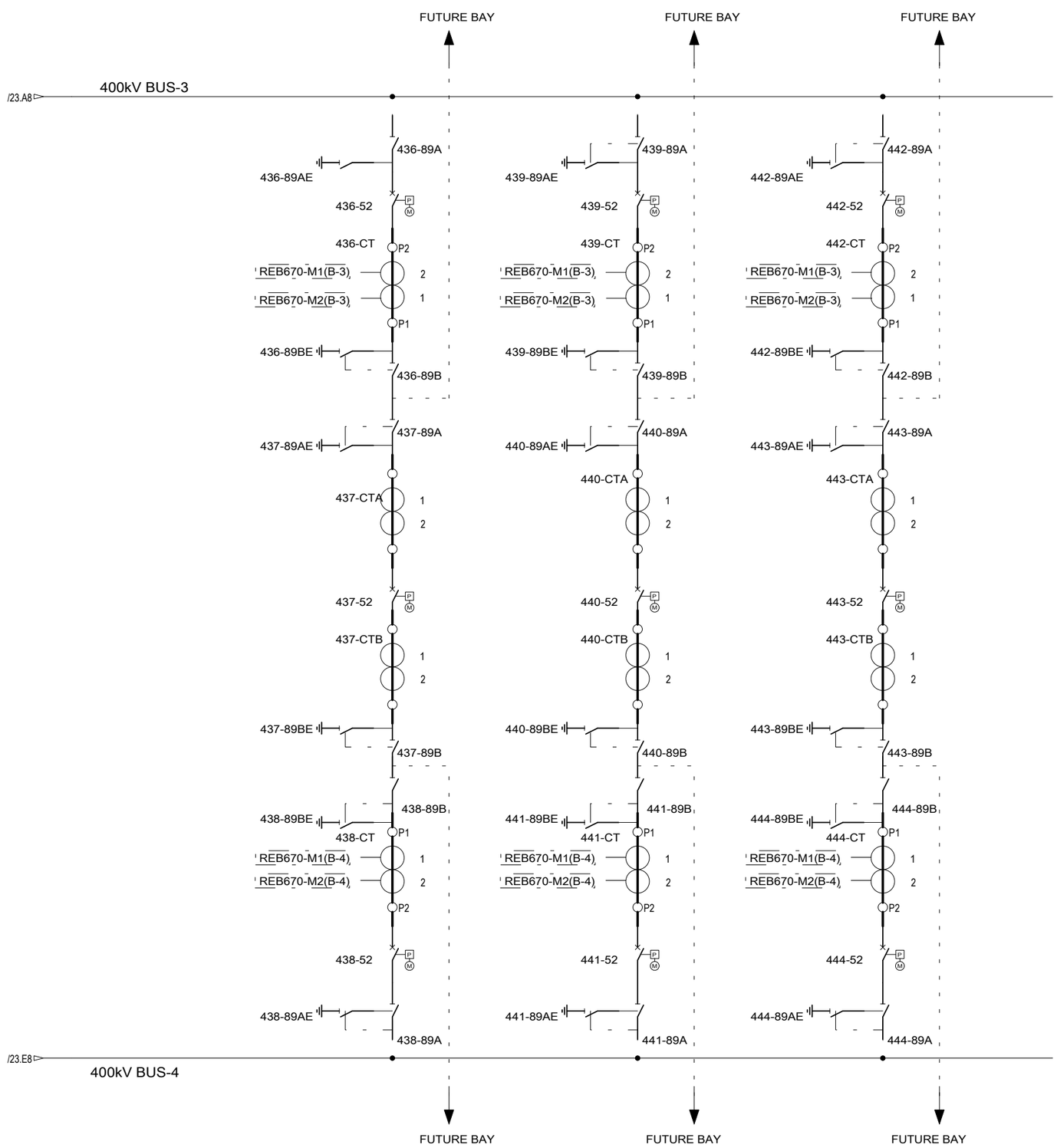
Sheet on 3100135063	Prepared	18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RES670 RELAY SLD	Doc kind Circuit diagram	Ref Doc.	=4R
	Approved	20.04.2023	DEENADAYALAN A		DCC EFS		
	Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp dept PG-GAS	Rev. ind. 00	Language en
				HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA		Sheet 22
Rev. Revision note	Date	Name					n sheet 23

1MNS801053-102(A3)(REV:01



Based on 3100135593			Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RED670 RELAY SLD	Doc. kind Circuit diagram	Ref Des. =4R
			Approved 20.04.2023	DEENADAYALAN A		DCC EFS	
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896			Resp. dept. PG-GAS	Rev. ind. 00
Rev.	Revision note	Date	Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Language en
							Sheet 23
1MNS801003-ISU/UR/EN/01							no. sheet 24

© 2023 Hitachi Energy. All rights reserved.



Based on 3100135063				Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY SLD	Doc. kind. Circuit diagram DCC EFS	Ref.Des. =4R
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 01 Language en
				Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited	Doc. no. 1MNS801837-CGCA	Sheet 24 n. sheet 25
Rev.	Revision note	Date	Name				

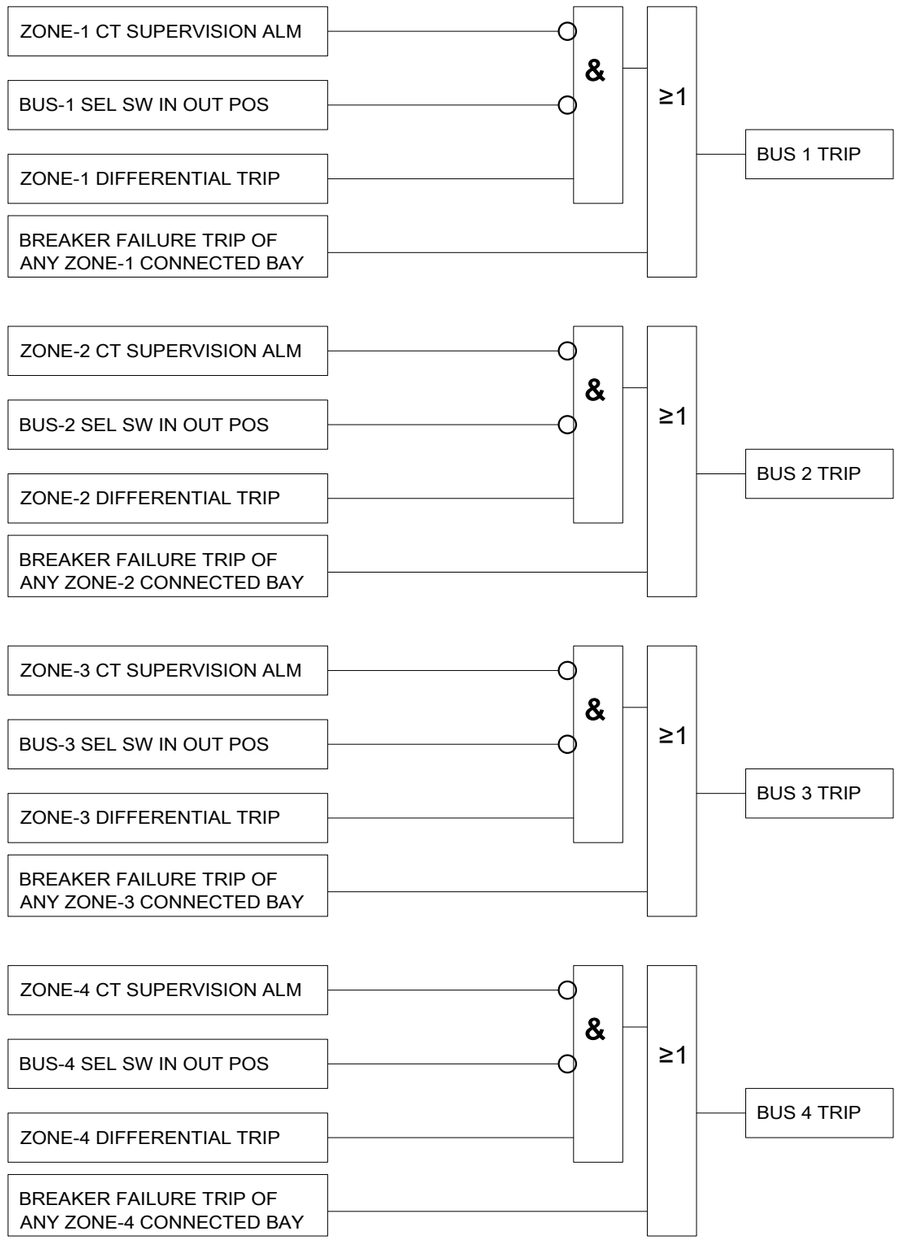
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

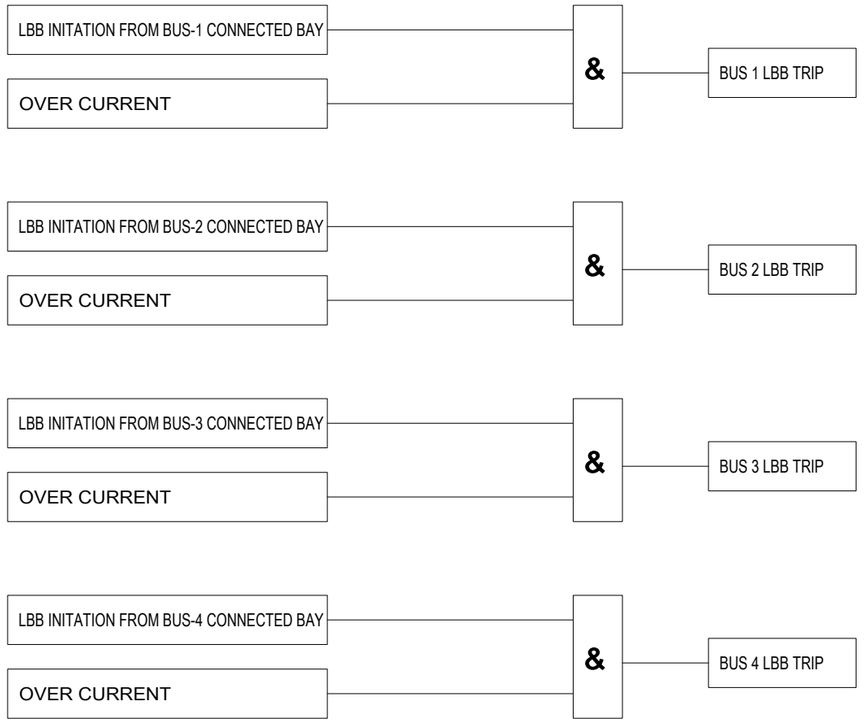
© 2023 Hitachi Energy. All rights reserved.

OVERALL BUSBAR TRIP LOGIC BUS-1/2/3/4

BUSBAR PROTECTION TRIP LOGIC BUS M1&M2



LBB PROTECTION TRIP LOGIC BUS M1&M2 (FUTURE USE)



Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

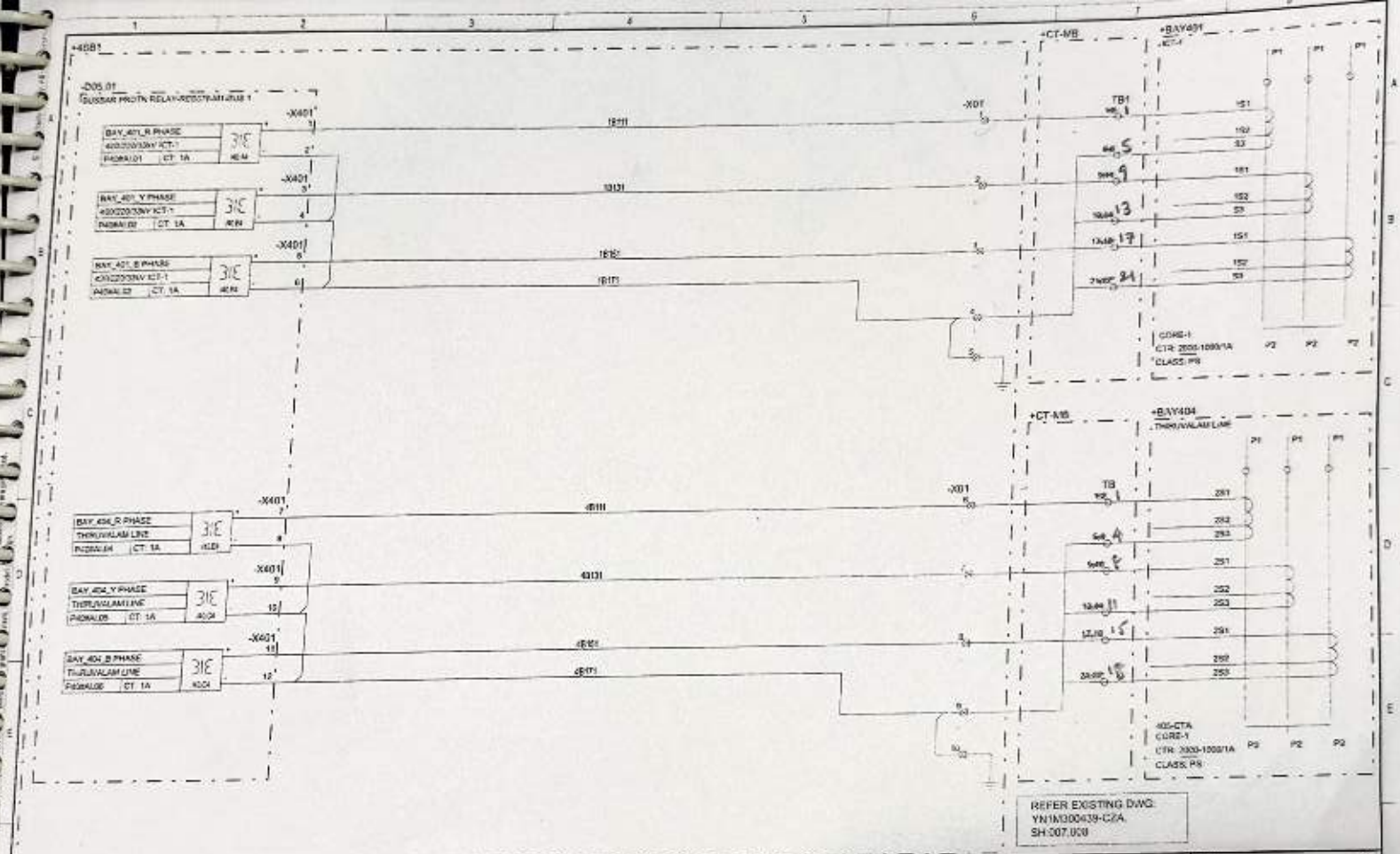
Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY BB & LBB OPTD LOGIC

HITACHI Hitachi Energy India Limited

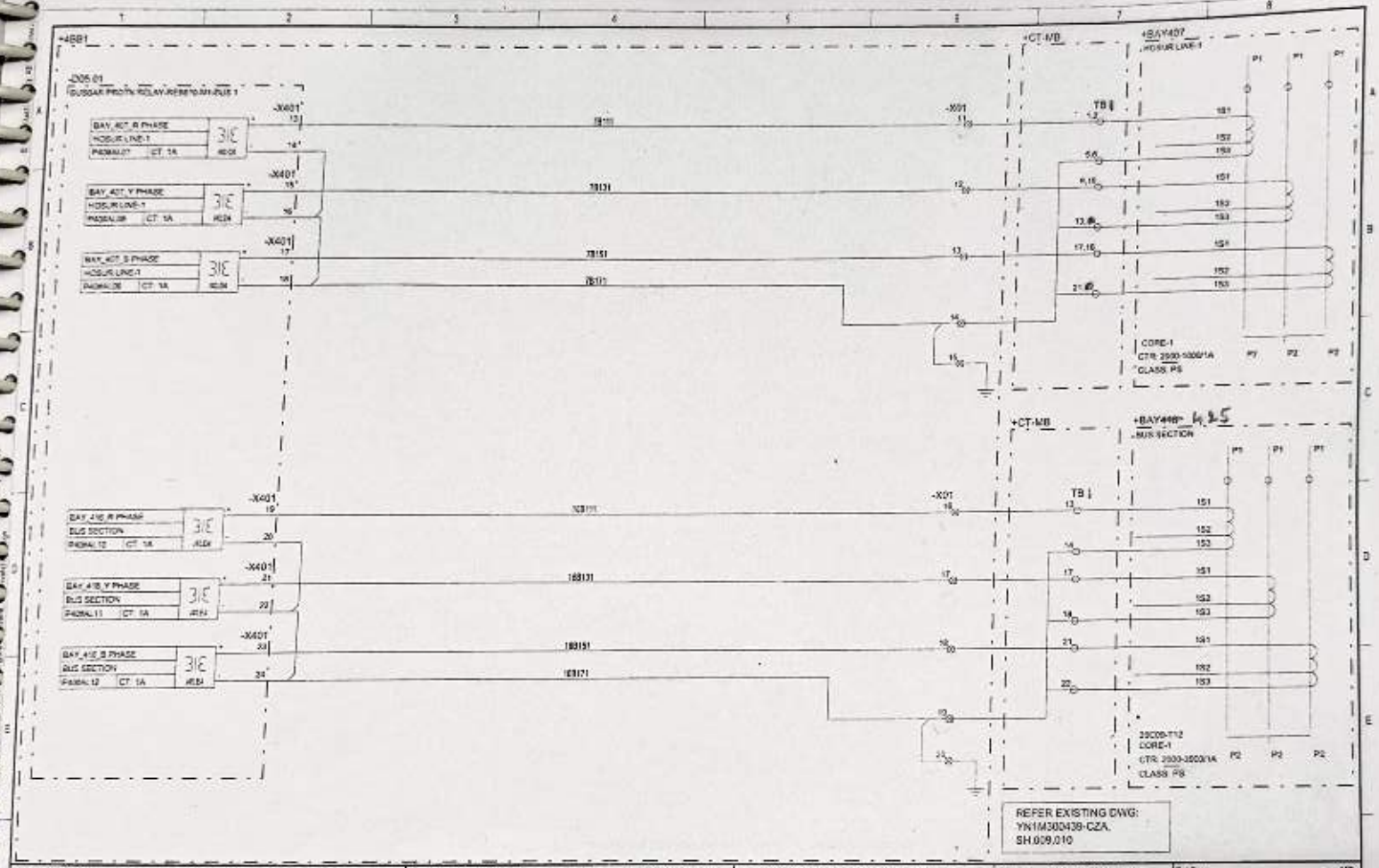
Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	25
		n. sheet	26

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

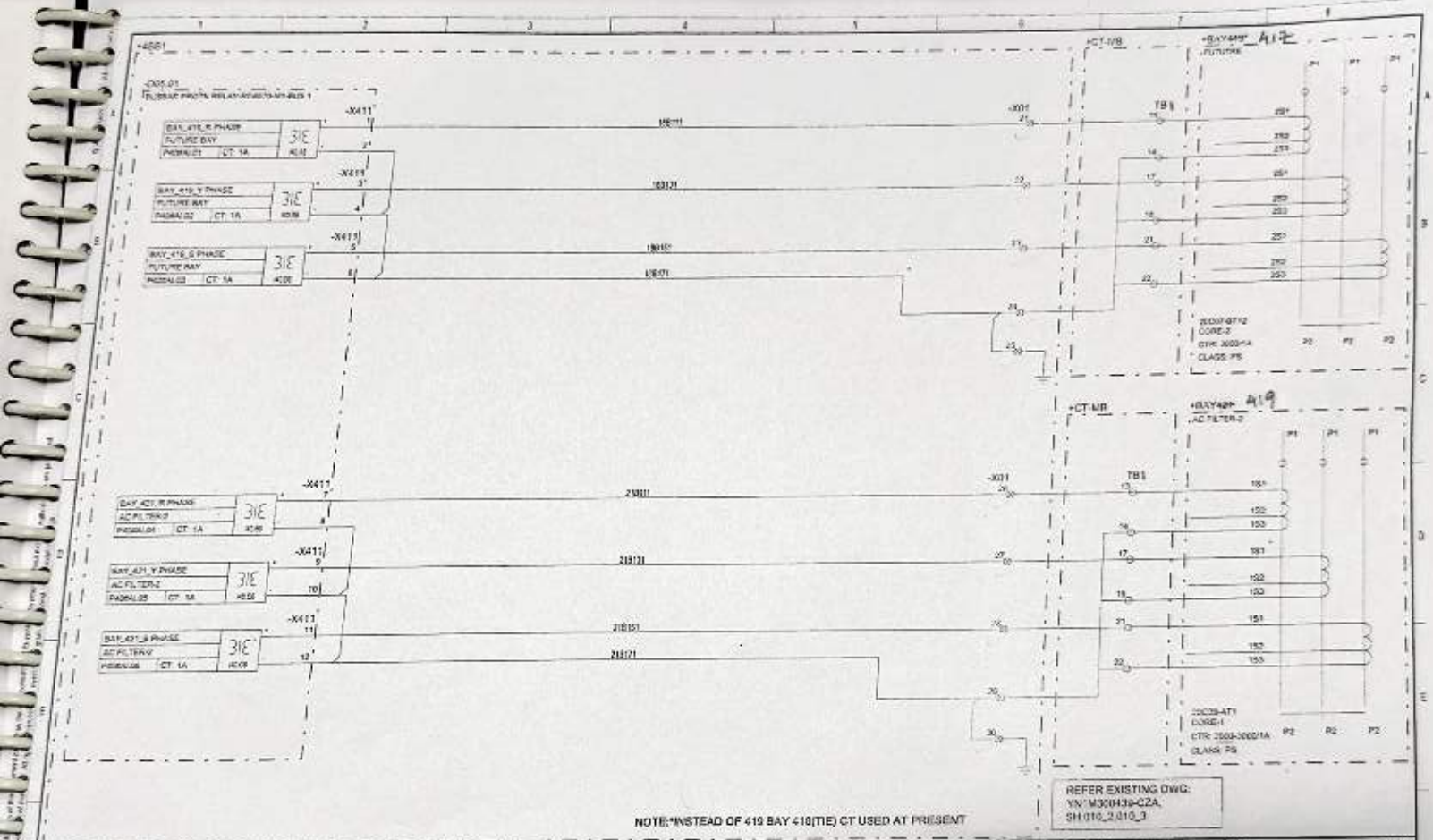


Based on 3100126503	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc. cont. Circuit diagram	Ref. Dcs.	=4R
	Approved 20.04.2023 DEENADAYALAN A		DCC: EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00	Language en
		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 28
Rev. Revision note Date Name					n. sheet 27



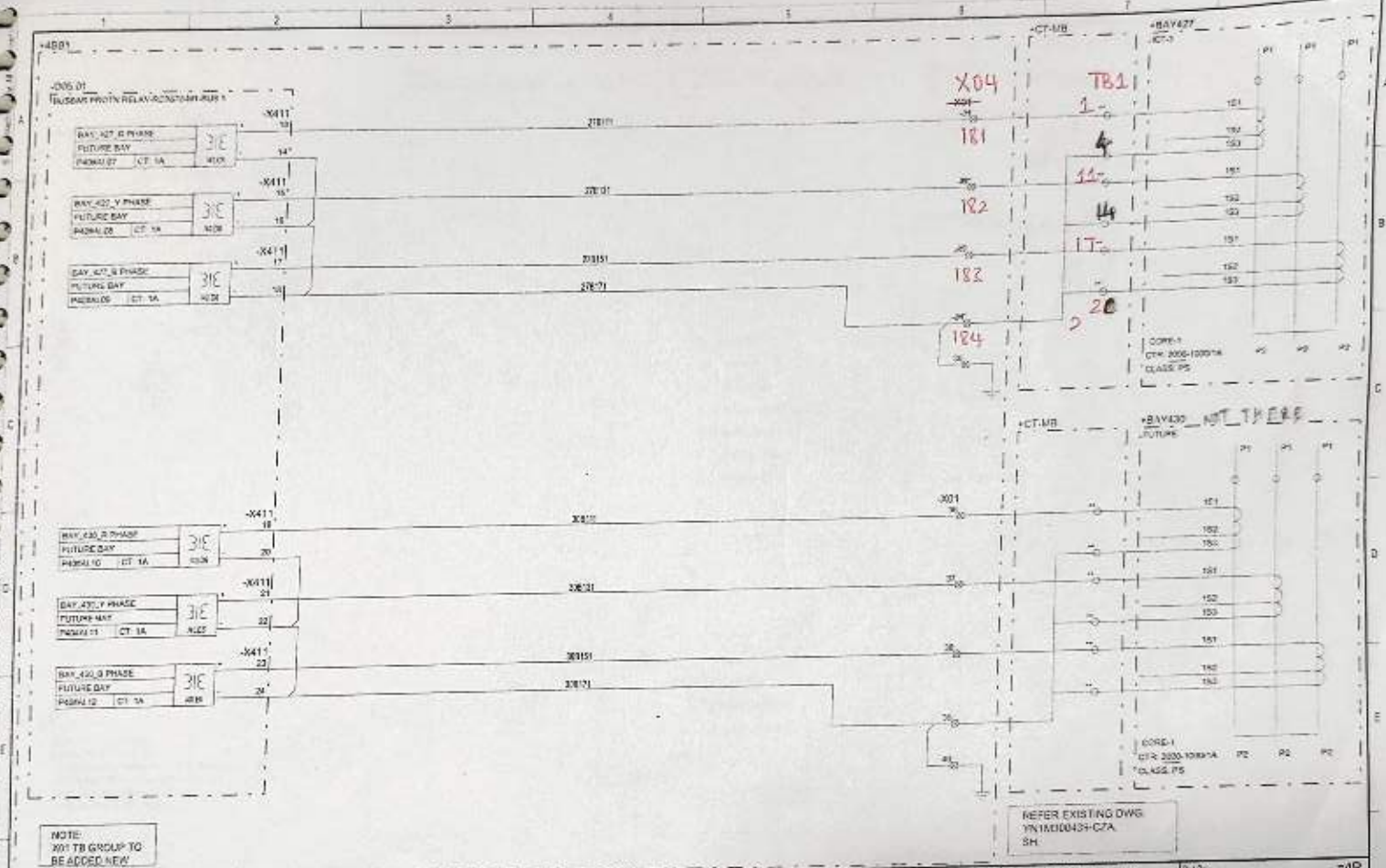
Based on 3100135363	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc.kind. Circuit diagram	Rut Doc.	=4R
	Approved 20.04.2023 DEENADAYALAN A		DCC EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896		Resp.dept. PG-GAS	Rev. ind. 00	Language en
Rev Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 27	
				n. sheet 28	

*MNS801003-R0201A2.REV01



Based on: 3100135963	Prepared: 18.04.2023	PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc. type: Circuit diagram DCC: EFS	Ref.Des. =4R
	Approved: 20.04.2023	DEENADAYALAN A		Resp. dept.: PG-GAS	Rev. no.: 00
	Project: POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137998		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no.: 1MNS801837-CGCA	Language: en Sheet: 28 t. sheet: 29
Rev.	Revision note	Date	Name		

1MNS801837-CGCA.vsd



Based on 3100135063	Prepared 13.04.2023 PANKAJ PATIL	765 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc. kind Circuit diagram	RefDes.	=4R
	Approved 20.04.2023 DEENADAYALAN A.		302 SFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137056	HITACHI Hitachi Energy India Limited (Formerly Known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS Rev. ind. 00	Language en	
			Doc. no. 1MNS801837-CGCA	Sheet 29	
Rev. Revision note Date Name				Sheets 30	

© 2023 Hitachi Energy. All rights reserved.

+4BB1

FROM SH: 006/2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

-X13 -813-01 -813-02

5 J5 1 2 4A
6 J6 1 2 4A

PSM
-X11
4 +
5 -
90-250VDC
PE
/40.B1

K101 +D.11-D11.02:1P3 /31.A5
K102 +B.05-1XX2:1 /31.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.101.101
Test
Normal
1B 1A
2B 2A
3B 3A
4B 4A
5B 5A
6B 6A
7B 7A
8B 8A
9B 9A
10B 10A
11B 11A
12B 12A
13B 13A
14B 14A
15B 15A
16B 16A
17B 17A
18B 18A

-D21.113.101
Test
Normal
1B 1A
2B 2A
3B 3A /26.A4
4B 4A /26.B4
5B 5A /26.B4
6B 6A /26.B4
7B 7A /26.D4
8B 8A /26.D4
9B 9A /26.E4
10B 10A /26.E4
11B 11A /27.A4
12B 12A /27.B4
13B 13A /27.B4
14B 14A /27.B4
15B 15A /27.D4
16B 16A /27.D4
17B 17A /27.E4
18B 18A /27.E4

-D21.125.101
Test
Normal
1B 1A
2B 2A
3B 3A /29.A4
4B 4A /29.B4
5B 5A /29.B4
6B 6A /29.B4
7B 7A /29.D4
8B 8A /29.D4
9B 9A /29.E4
10B 10A /29.E4
11B 11A
12B 12A
13B 13A
14B 14A
15B 15A
16B 16A
17B 17A
18B 18A

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:012

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 30
n. sheet 31

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB1

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

-X31 1	MAIN 1 BUS 1 PROT IN	P3#BI.01	220-250VDC	/41.A2
-X31 3	MAIN 1 BUS 1 PROT OUT	P3#BI.02	220-250VDC	/41.B2
-X31 5	SPARE	P3#BI.03	220-250VDC	/41.B2
-X31 7	TRIP RELAY RESET 96A BUS-1	P3#BI.04	220-250VDC	/41.B2
-X31 9	SPARE	P3#BI.05	220-250VDC	/41.C2
-X31 11	SPARE	P3#BI.06	220-250VDC	/41.C2
-X31 13	SPARE	P3#BI.07	220-250VDC	/41.C2
-X31 15	REB670 RELAY FAULTY BUS 1 - MAIN 2	P3#BI.08	220-250VDC	/41.D2

-1XX2 1

+D.05-D05.01:5 (-X11) /30.B2
K102

+D.05-D05.01:4 (-X11) /30.B2
K101

K103
K104
K105
K106
K107
K108
K109
K110

-D11.02
1P3 — 1P4 /31.A7 IN
BB-1 M1 IN/OUT SWITCH

-D11.02
1P2 /31.A7 OUT — 1P1
BB-1 M1 IN/OUT SWITCH

-1X04
1 K101 /170.B4
2 K106 /170.A1 +D.13-D13.101.101:221
3 K107
4 K108
5 K109

+4BB1

-D11.02
1P2 /31.B4 — 1P1 — C — 1P3 — 1P4 /31.B4 — A
2P2 — 2P1 — C — 2P3 — 2P4 — A
3P2 — 3P1 — C — 3P3 — 3P4 — A
4P2 — 4P1 — C — 4P3 — 4P4 — A
IN A
OUT C
BB-1 M1 IN/OUT SWITCH

+4BB5

+D.05
-X14A 1 — -X14A 1 — -X11 2
-X14A 2 — -X14A 2 — -X11 3
-X11 1
/112.B2
BB RELAY FAULTY
BUS-1 MAIN2

NOTE:
1X04 TB GROUP
TO BE ADDED NEW

+B.05-1XX2:2
/32.A3 K102

+B.17-X04:13
/32.A5 K101

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

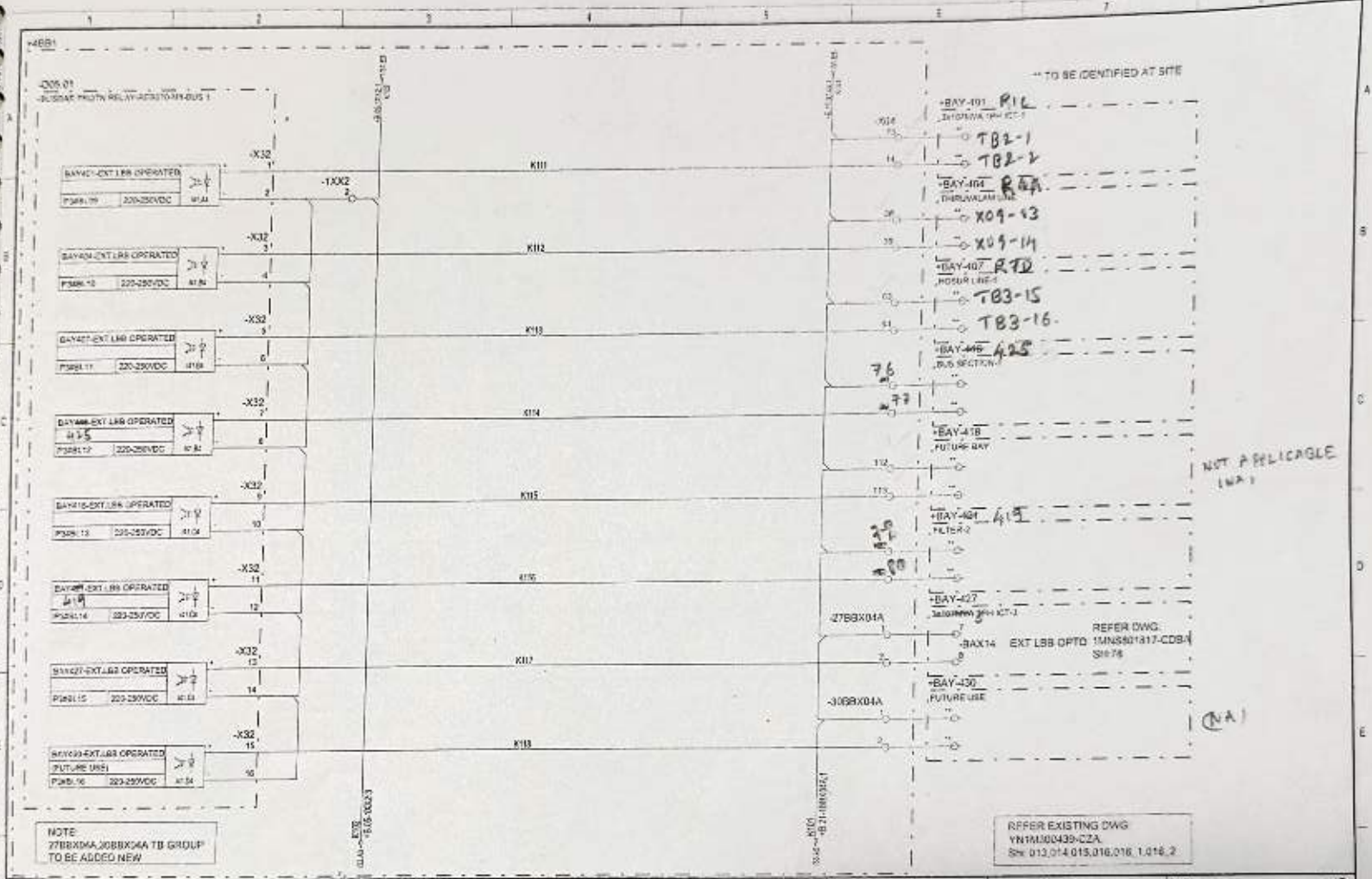
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

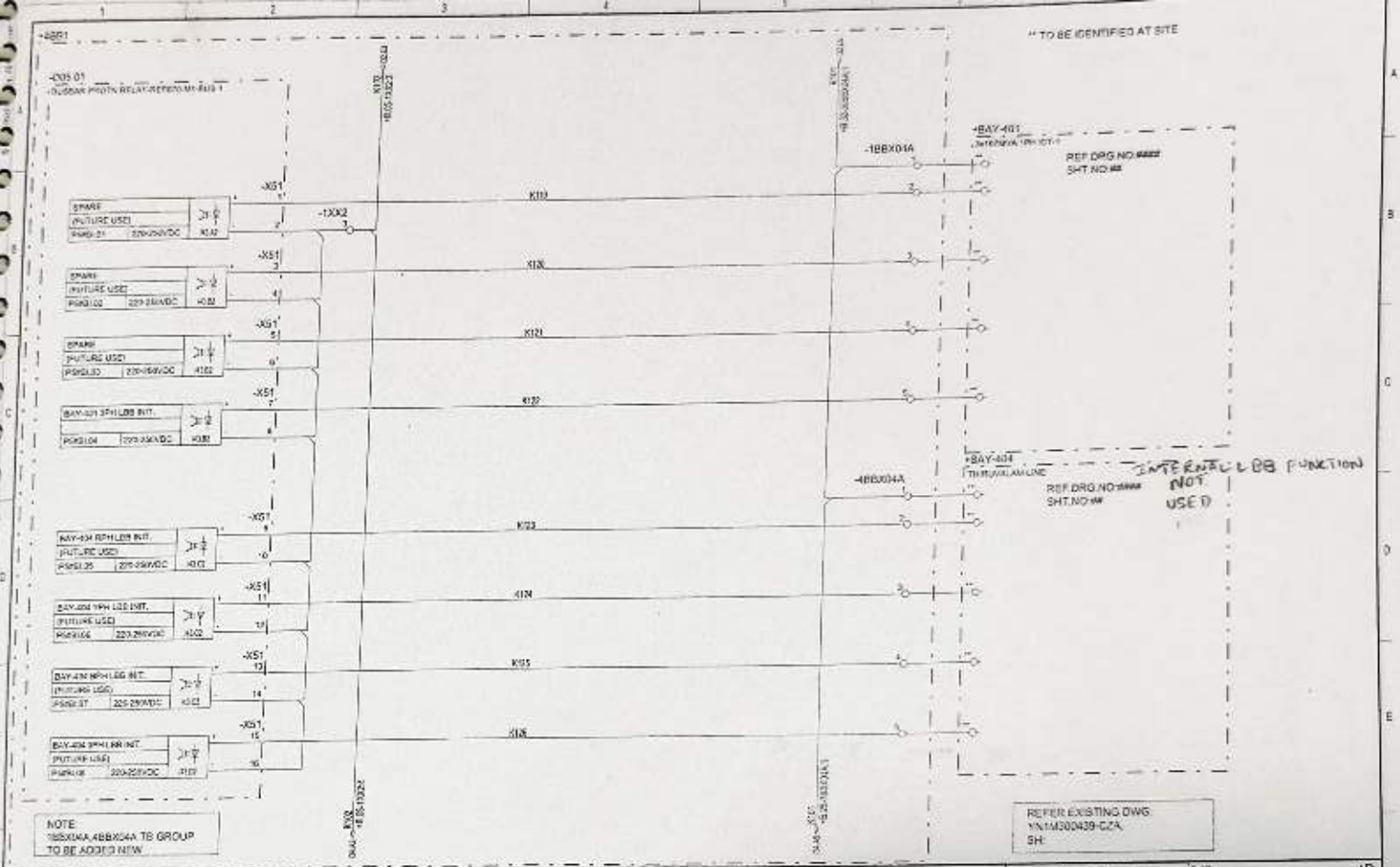
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 31
n. sheet 32

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

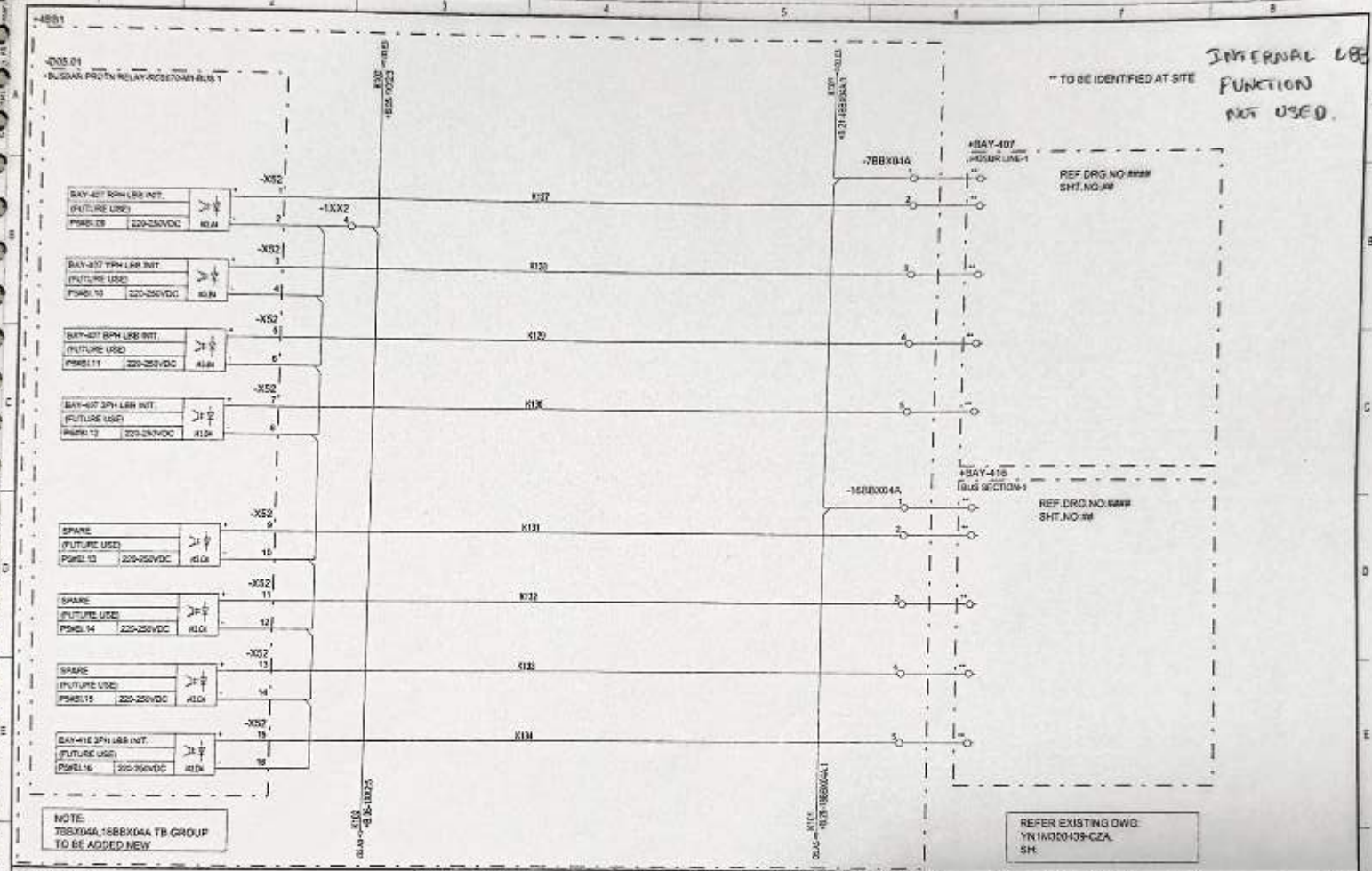


Based on 3100136063	Prepared	18.04.2023	PANKAJ PATIL	Tde 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS	Doc kind Circuit diagram	Ref Des	=4R
	Approved	20.04.2023	DEENADAYALAN A		DOC EFS		
	Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note	Date	Name		HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA		Sheet 32
							No. sheet 33

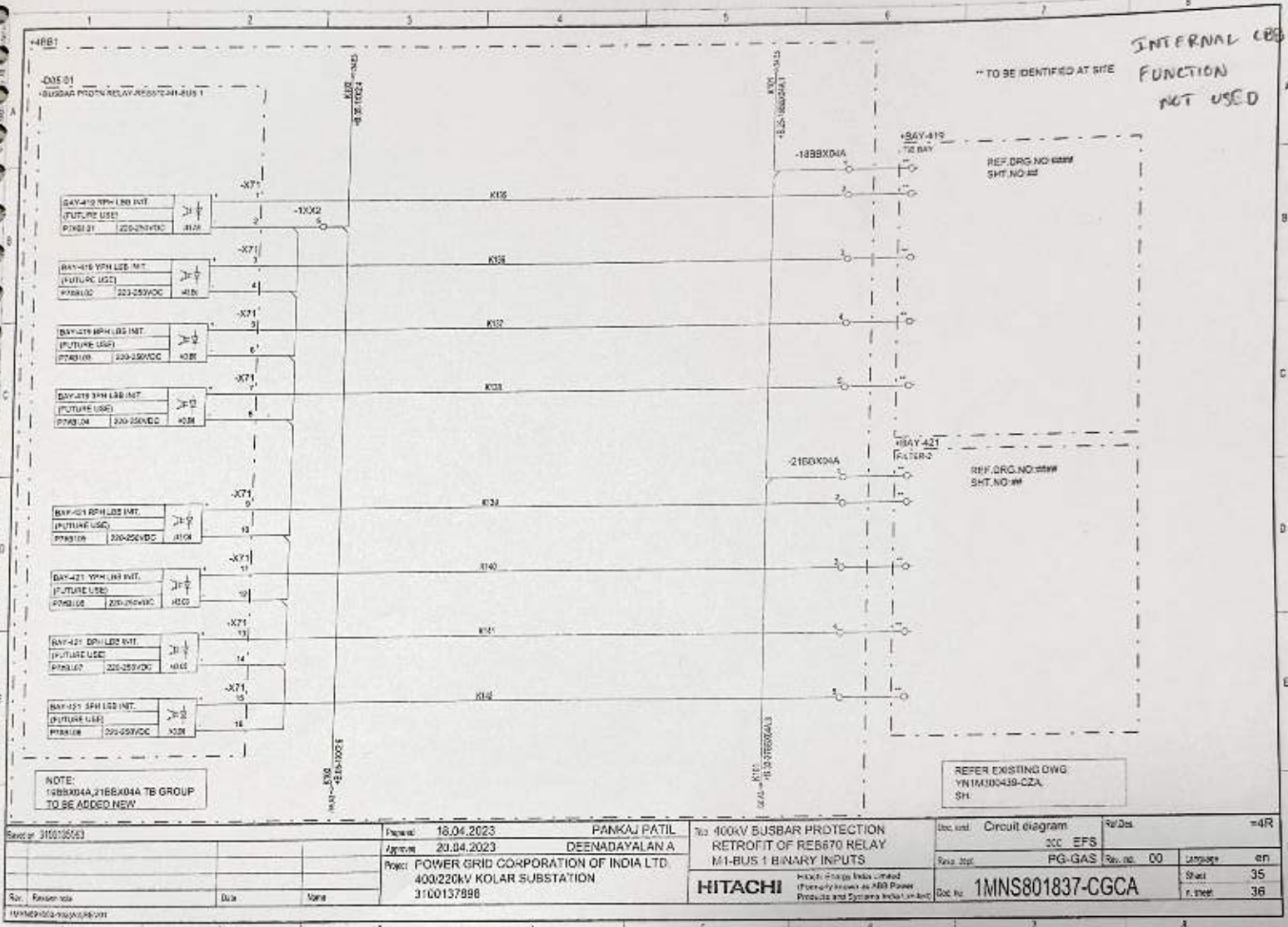


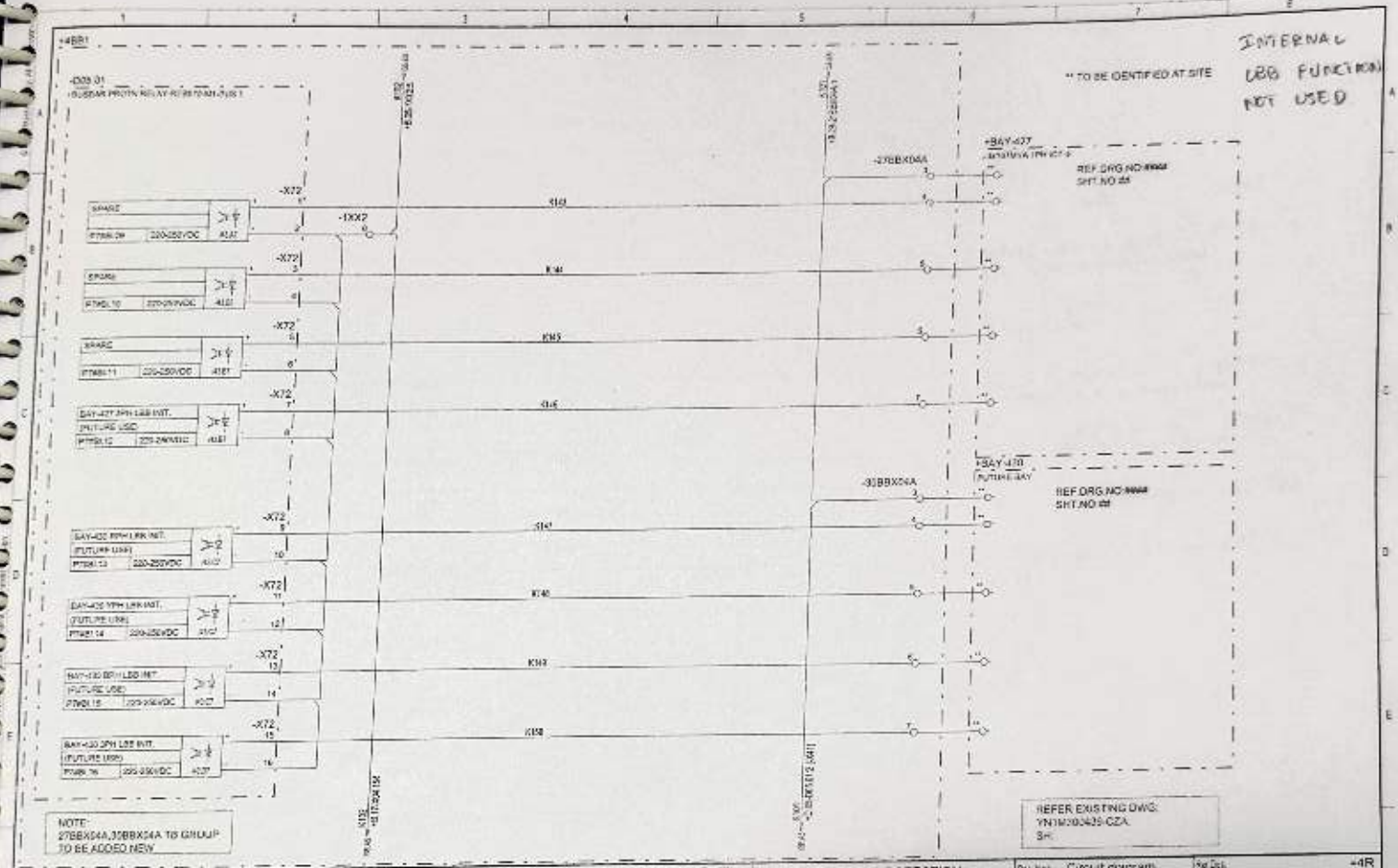
Based on 3100137993			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS	Doc kind Circuit diagram	Rel/Ba.	=4R
			Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137998	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. no. 00	Language en
					Doc. no. 1MNS801837-CGCA		Sheet 33
Rev.	Revision note	Date	Name				n. sheet 34

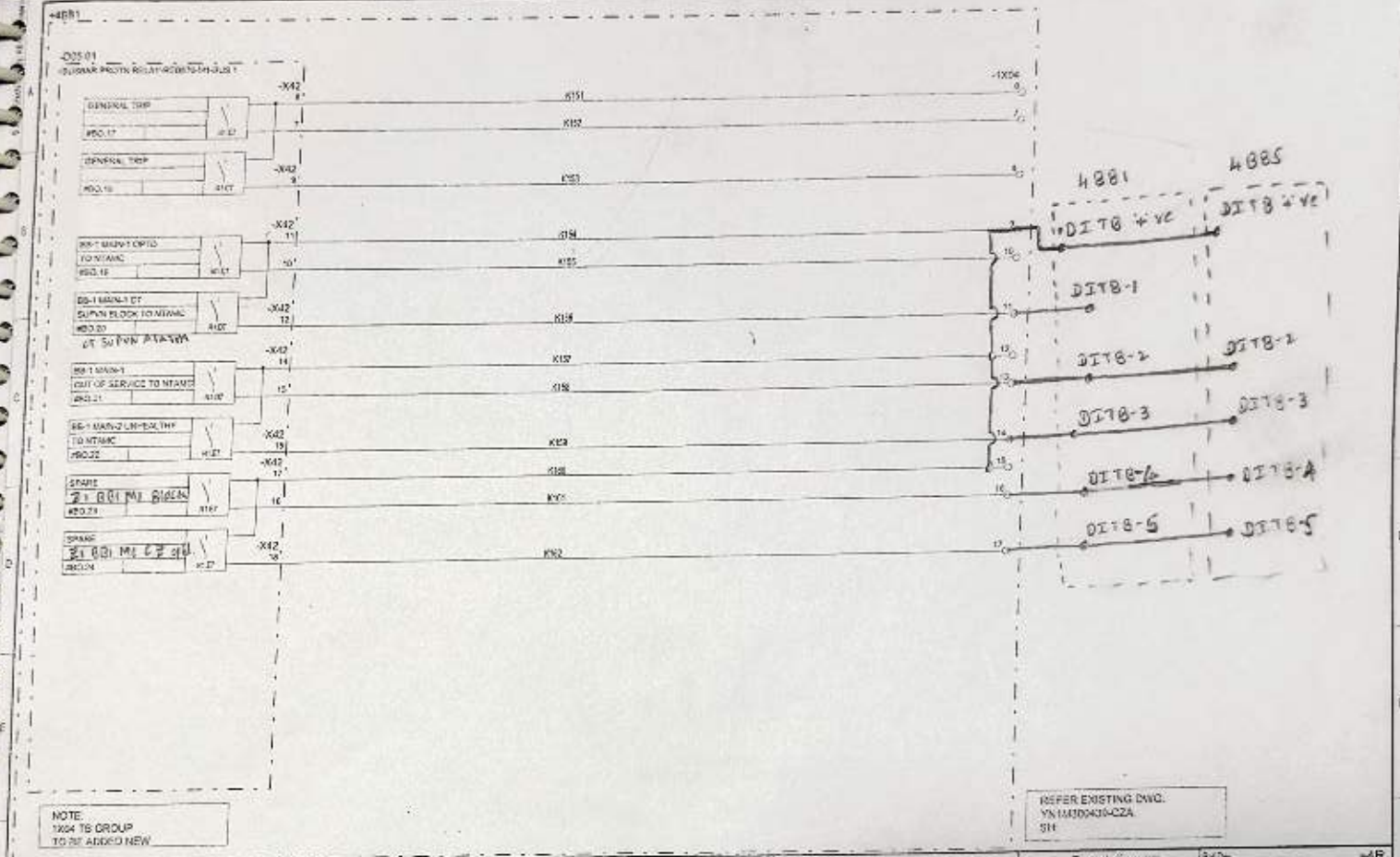
1MNW801000-1SUA01REV01



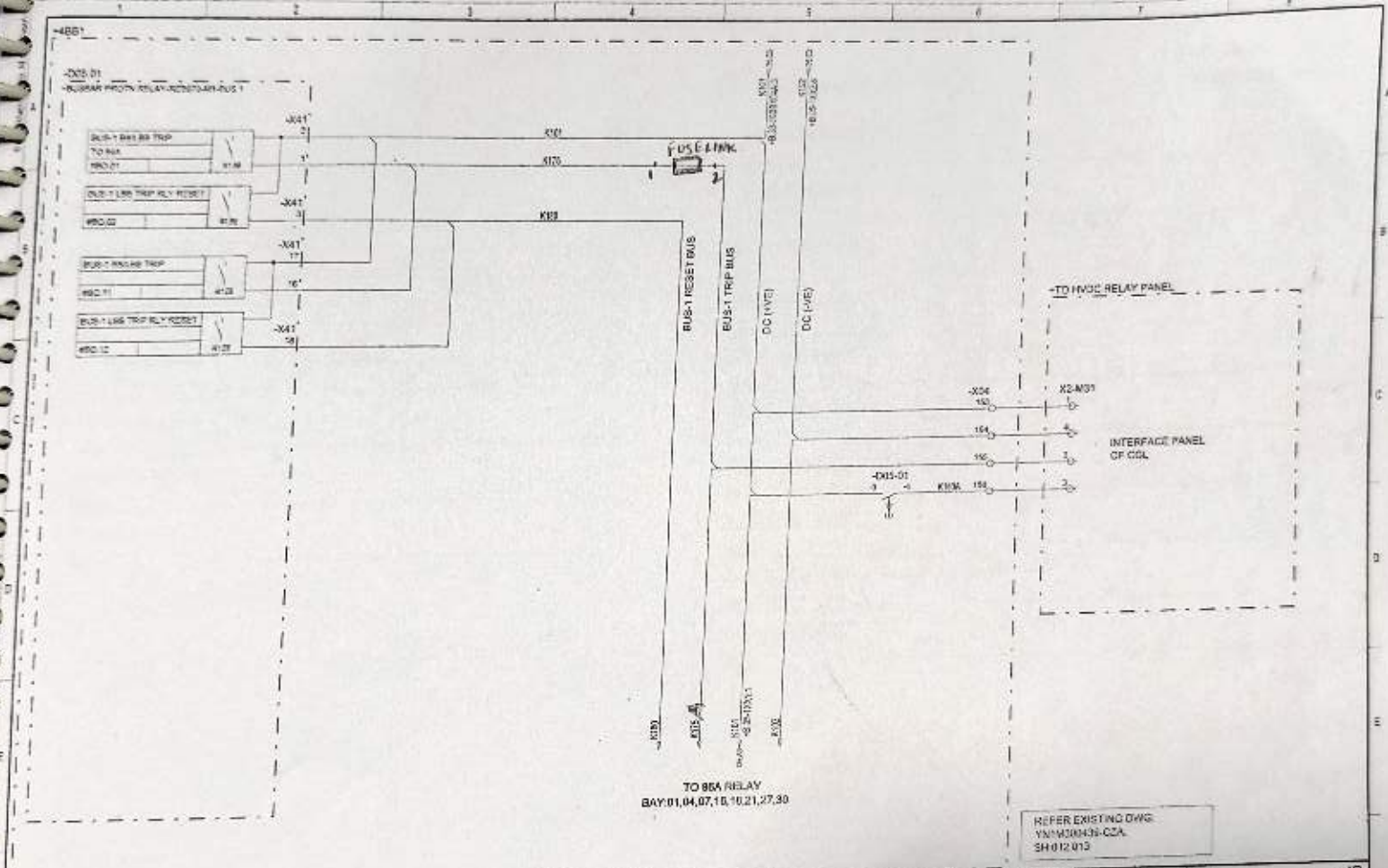
Based on 3100135963	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS	Doc. type Circuit diagram	Rel.Doc.	=4R
	Approved 20.04.2023 DEENADAYALAN A.		Doc. spec. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Template code PG-GAS	Rev. no. C0	Language en
Rev. Revision note	Date Name	HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 34 / No. sheet 35
SMWW1003-100,A3,REV01					


INTERNAL CB FUNCTION NOT USED
** TO BE IDENTIFIED AT SITE
+BAY-415
TIE BAY
-189BX04A
REF.DRG.NO:#####
SHT.NO:##
+BAY-421
FILTER-2
-216BX04A
REF.DRG.NO:#####
SHT.NO:##
NOTE:
189BX04A,216BX04A TB GROUP TO BE ADDED NEW
REFER EXISTING DWG
YN1M300439-CZA,
SH:
Based on 3100135563
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD
400/220kV KOLAR SUBSTATION
3100137998
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS
Doc kind Circuit diagram
Doc type PG-GAS
Rev. no. 00
Language en
Sheet 35
n. sheet 36
HITACHI
Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Ltd.)
Doc. no. 1MNS801837-CGCA
Rev. Revision note Date Name

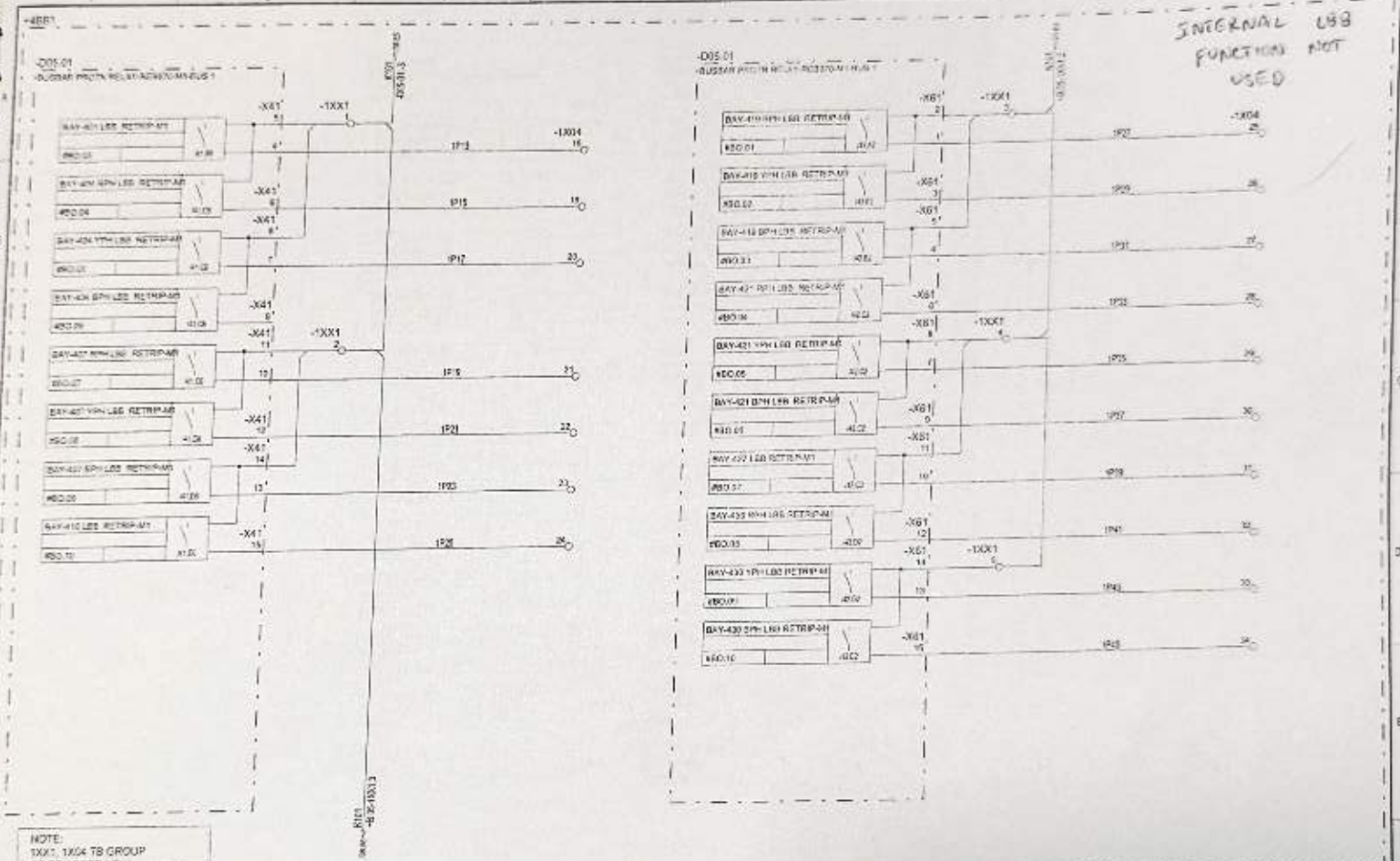

INTERNAL LBB FUNCTION NOT USED
** TO BE IDENTIFIED AT SITE
+BAY-427
REF.ORG NO:
SHT.NO:
+BAY-428
(FUTURE BAY)
REF.ORG NO:
SHT.NO:
-27BBX04A
-30BBX04A
-X72
-1XX2
K161
K141
K143
K145
K147
K149
K151
K153
K155
K157
K159
NOTE:
27BBX04A,30BBX04A TO GROUP TO BE ADDED NEW
REFER EXISTING DWG:
YN1M200425-CGA
SH:
Circuit diagram
PG-GAS
1MNS801837-CGCA
00
36
37
PANKAJ PATIL
DEENADAYALAN A
18.04.2023
20.04.2023
POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898
400KV BUSBAR PROTECTION
RETROFIT OF RES670 RELAY
M1-BUS 1 BINARY INPUTS
HITACHI



Based on 3100135909	Prepared	18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY OUTPUTS	Doc. type: Circuit diagram	Rel Des.	-4R
	Approved	20.04.2023	DEENADAYALAN A		Doc. cont. 002 EFS		
	Project: POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898				Resp. dept. PG-GAS	Rev. no. 00	Language en
				HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 37
Rev.	Revision note	Date	Name				No. sheet 38

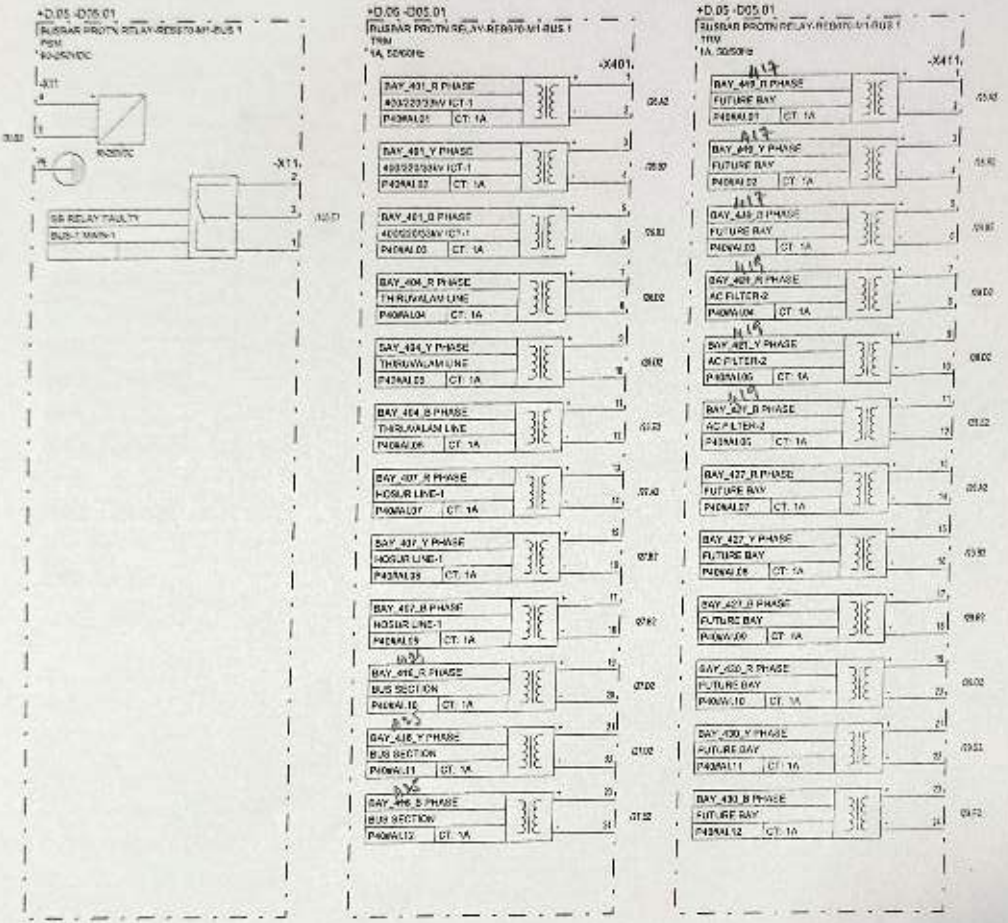


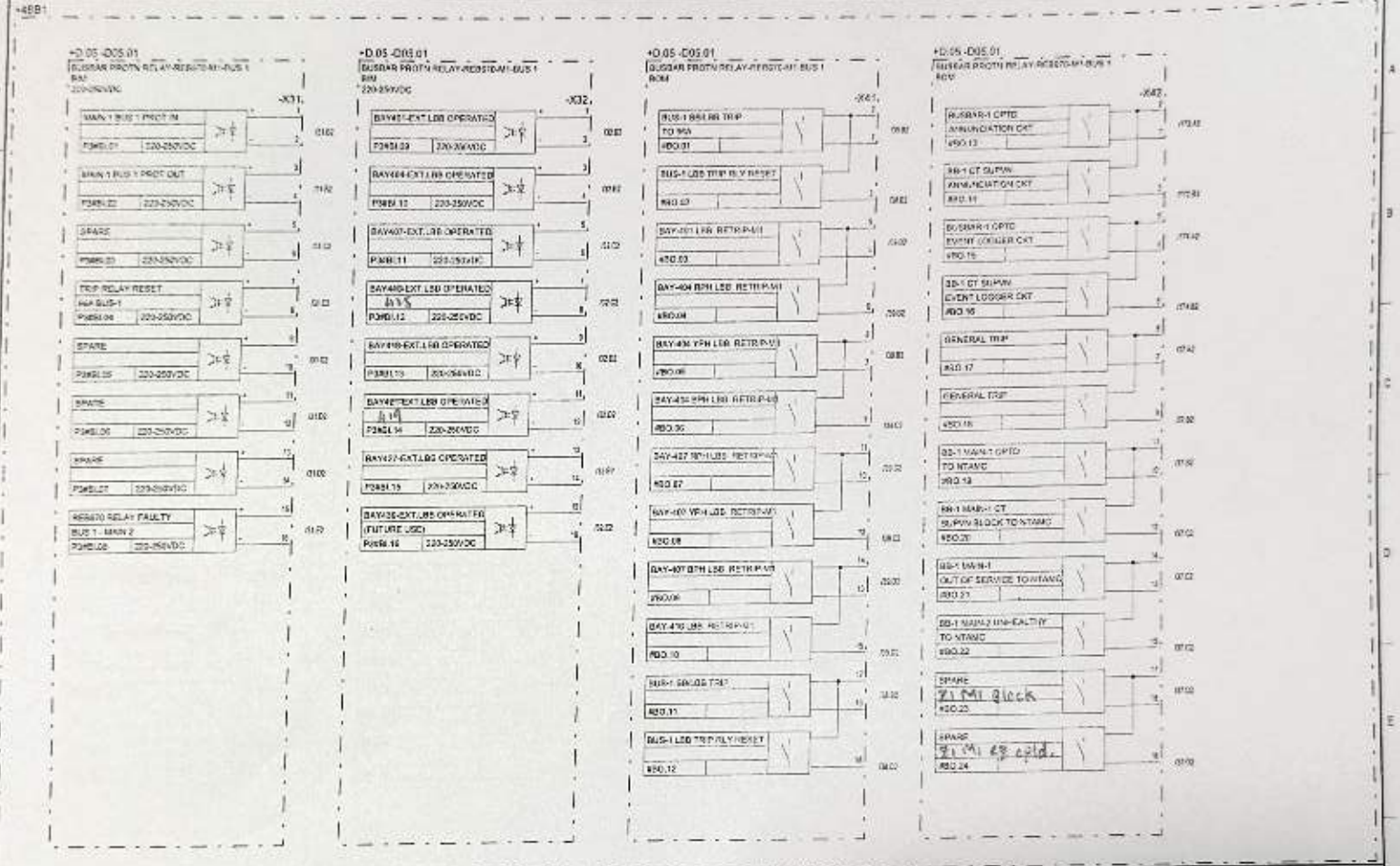
Based on: 3100136963	Prepared: 19.04.2023 PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY OUTPUTS	Doc kind: Circuit diagram	Ref Dgs.	=4R
	Approved: 20.04.2023 DEENADAYALAN A		CCF EFS		
	Project: POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Proj. dept: PG-GAS Rev. nr: 00	Language: en	
			Doc nr: 1MNS801837-CGCA	Sheet: 38	
				n. sheet: 39	



Based on 3100135363			Prepared 18.04.2023	PANKAJ PATIL	
			Approved 20.04.2023	DEENADAYALAN A	
Rev.	Revision note	Date	Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137998	

for 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY OUTPUTS	Doc. kind Circuit diagram	Ref Des.	=4R
	Doc. type 300 EFS		
HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept PG-GAS	Rev. ind. 00	Language en
	Doc. no. 1MNS801837-CGCA		Sheet 39
			# sheet 40


+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BAY_401_R PHASE
BAY_401_Y PHASE
BAY_401_B PHASE
BAY_404_R PHASE
BAY_404_Y PHASE
BAY_404_B PHASE
BAY_407_R PHASE
BAY_407_Y PHASE
BAY_407_B PHASE
BAY_416_R PHASE
BAY_416_Y PHASE
BAY_416_B PHASE
BAY_417_R PHASE
BAY_417_Y PHASE
BAY_417_B PHASE
BAY_420_R PHASE
BAY_420_Y PHASE
BAY_420_B PHASE
BAY_421_R PHASE
BAY_421_Y PHASE
BAY_421_B PHASE
BAY_427_R PHASE
BAY_427_Y PHASE
BAY_427_B PHASE
BAY_430_R PHASE
BAY_430_Y PHASE
BAY_430_B PHASE
FUTURE BAY
AC FILTER-2
BUS SECTION
THIRUVALAM LINE
HOSUR LINE-1
SR RELAY FAULTY



Spec nr. 3100135083	Prepared 18.04.2023 PANKAJ PATIL	Tit 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 OVERVIEW	Doc kind Circuit diagram	Rel Doc.	=4R
	Approved 20.04.2023 DEENADAYALAN A		Doc. no. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137808		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Sheet 41	
				n. sheet 42	

© 2023 Hitachi Energy. All rights reserved.

+4BB1

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 1
BOM

-X61

BAY-419 RPH LBB RETRIP-M1 #BO.01	2	1	/39.B5
BAY-419 YPH LBB RETRIP-M1 #BO.02	3		/39.B5
BAY-419 BPH LBB RETRIP-M1 #BO.03	5	4	/39.B5
BAY-421 RPH LBB RETRIP-M1 #BO.04		6	/39.C5
BAY-421 YPH LBB RETRIP-M1 #BO.05	8	7	/39.C5
BAY-421 BPH LBB RETRIP-M1 #BO.06		9	/39.C5
BAY-427 LBB RETRIP-M1 #BO.07	11	10	/39.D5
BAY-430 RPH LBB RETRIP-M1 #BO.08		12	/39.D5
BAY-430 YPH LBB RETRIP-M1 #BO.09	14	13	/39.D5
BAY-430 BPH LBB RETRIP-M1 #BO.10		15	/39.E5
BUSBAR-1 Bph OPTD EVENT LOGGER CKT #BO.11	17	16	/174.B2
BB-1 CT SUPVN EVENT LOGGER CKT #BO.12		18	/174.B2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 1
BOM

X62

SPARE #BO.13	2	1
SPARE #BO.14		3
SPARE #BO.15	5	4
SPARE #BO.16		6
SPARE #BO.17	8	7
SPARE #BO.18		9
SPARE #BO.19	11	10
SPARE #BO.20		12
SPARE #BO.21	14	13
SPARE #BO.22		15
SPARE #BO.23	17	16
SPARE #BO.24		18

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 42
n. sheet 43

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB1

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X51

SPARE (FUTURE USE) P5#BI.01 220-250VDC	+ 1	- 2	/33.B2
SPARE (FUTURE USE) P5#BI.02 220-250VDC	+ 3	- 4	/33.B2
SPARE (FUTURE USE) P5#BI.03 220-250VDC	+ 5	- 6	/33.C2
BAY-401 3PH LBB INIT. P5#BI.04 220-250VDC	+ 7	- 8	/33.C2
BAY-404 RPH LBB INIT. (FUTURE USE) P5#BI.05 220-250VDC	+ 9	- 10	/33.D2
BAY-404 YPH LBB INIT. (FUTURE USE) P5#BI.06 220-250VDC	+ 11	- 12	/33.D2
BAY-404 BPH LBB INIT. (FUTURE USE) P5#BI.07 220-250VDC	+ 13	- 14	/33.E2
BAY-404 3PH LBB INIT. (FUTURE USE) P5#BI.08 220-250VDC	+ 15	- 16	/33.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X52

BAY-407 RPH LBB INIT. (FUTURE USE) P5#BI.09 220-250VDC	+ 1	- 2	/34.B2
BAY-407 YPH LBB INIT. (FUTURE USE) P5#BI.10 220-250VDC	+ 3	- 4	/34.B2
BAY-407 BPH LBB INIT. (FUTURE USE) P5#BI.11 220-250VDC	+ 5	- 6	/34.C2
BAY-407 3PH LBB INIT. (FUTURE USE) P5#BI.12 220-250VDC	+ 7	- 8	/34.C2
SPARE (FUTURE USE) P5#BI.13 220-250VDC	+ 9	- 10	/34.D2
SPARE (FUTURE USE) P5#BI.14 220-250VDC	+ 11	- 12	/34.D2
SPARE (FUTURE USE) P5#BI.15 220-250VDC	+ 13	- 14	/34.E2
BAY-416 3PH LBB INIT. (FUTURE USE) P5#BI.16 220-250VDC	+ 15	- 16	/34.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X71

BAY-419 RPH LBB INIT. (FUTURE USE) P7#BI.01 220-250VDC	+ 1	- 2	/35.B2
BAY-419 YPH LBB INIT. (FUTURE USE) P7#BI.02 220-250VDC	+ 3	- 4	/35.B2
BAY-419 BPH LBB INIT. (FUTURE USE) P7#BI.03 220-250VDC	+ 5	- 6	/35.C2
BAY-419 3PH LBB INIT. (FUTURE USE) P7#BI.04 220-250VDC	+ 7	- 8	/35.C2
BAY-421 RPH LBB INIT. (FUTURE USE) P7#BI.05 220-250VDC	+ 9	- 10	/35.D2
BAY-421 YPH LBB INIT. (FUTURE USE) P7#BI.06 220-250VDC	+ 11	- 12	/35.D2
BAY-421 BPH LBB INIT. (FUTURE USE) P7#BI.07 220-250VDC	+ 13	- 14	/35.E2
BAY-421 3PH LBB INIT. (FUTURE USE) P7#BI.08 220-250VDC	+ 15	- 16	/35.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X72

SPARE P7#BI.09 220-250VDC	+ 1	- 2	/36.B2
SPARE P7#BI.10 220-250VDC	+ 3	- 4	/36.B2
SPARE P7#BI.11 220-250VDC	+ 5	- 6	/36.C2
BAY-427 3PH LBB INIT. (FUTURE USE) P7#BI.12 220-250VDC	+ 7	- 8	/36.C2
BAY-430 RPH LBB INIT. (FUTURE USE) P7#BI.13 220-250VDC	+ 9	- 10	/36.D2
BAY-430 YPH LBB INIT. (FUTURE USE) P7#BI.14 220-250VDC	+ 11	- 12	/36.D2
BAY-430 BPH LBB INIT. (FUTURE USE) P7#BI.15 220-250VDC	+ 13	- 14	/36.E2
BAY-430 3PH LBB INIT. (FUTURE USE) P7#BI.16 220-250VDC	+ 15	- 16	/36.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

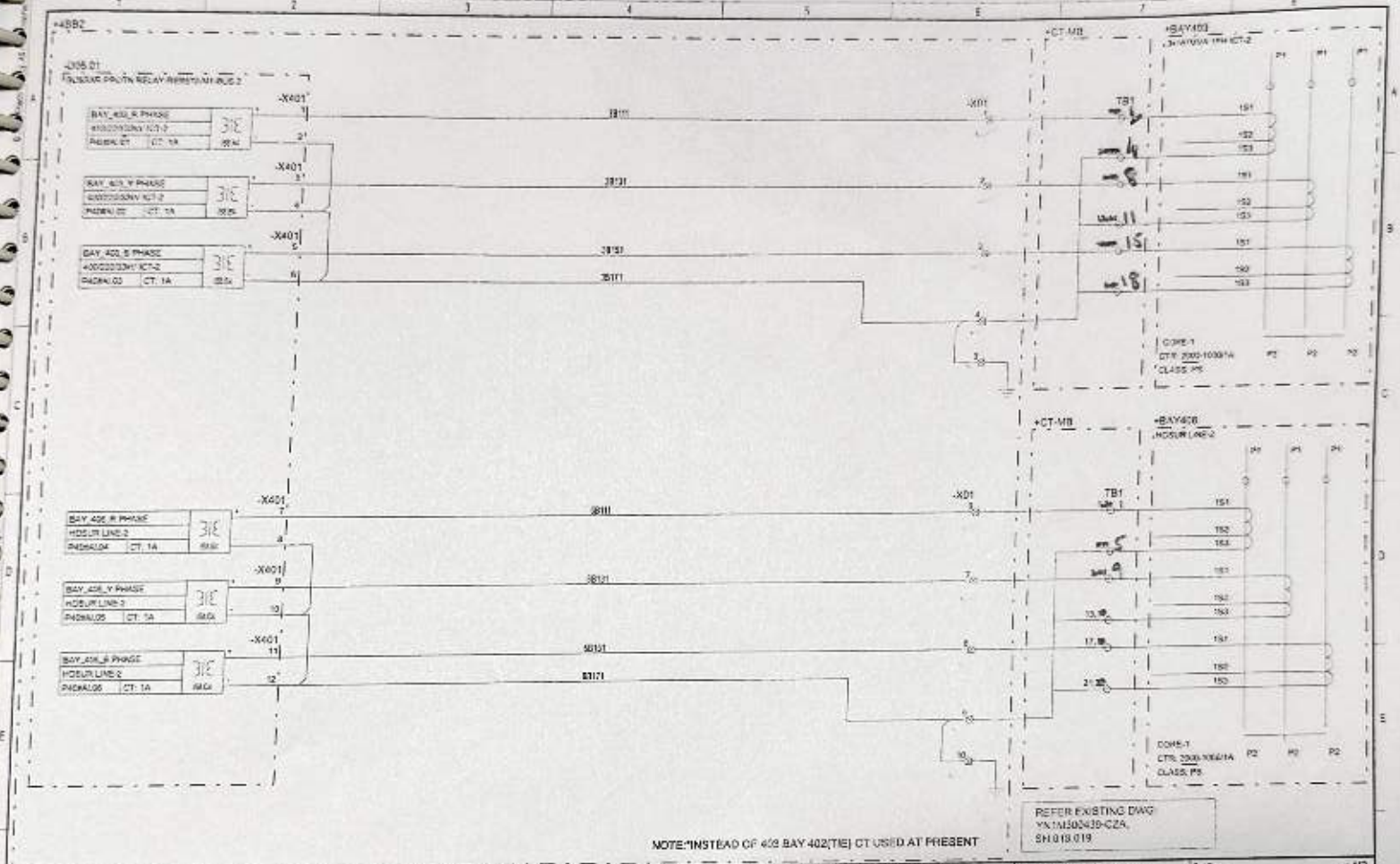
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 43
n. sheet 44

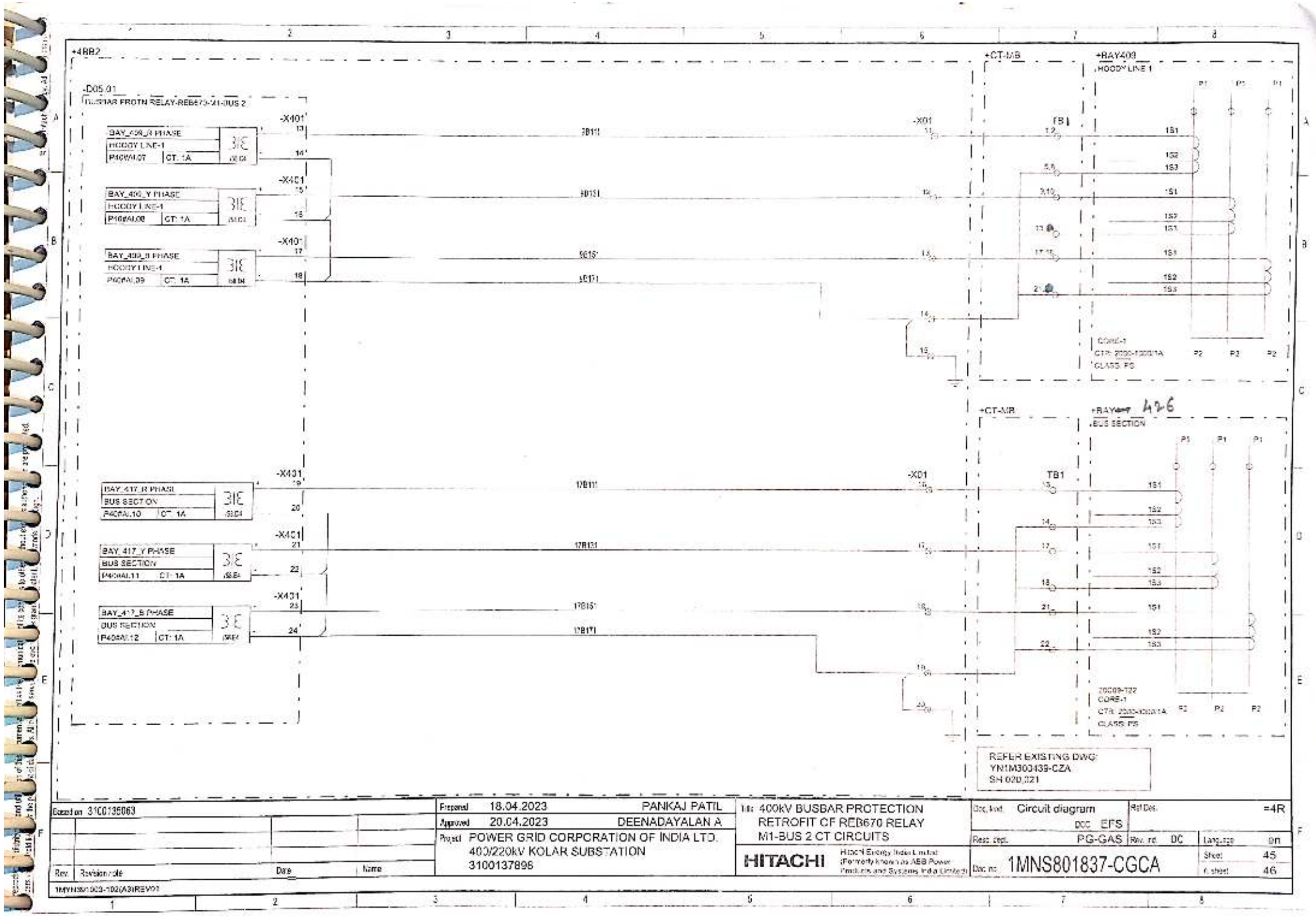
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Rel Dta	+4R
	Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp dept PG-GAS	Rev. ind. 00	Language en
		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA		Sheet 44 / Sheet 45
Rev. Amendments	Date Name				

Scanned with OKEN Scanner



Based on 3100136063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 CT CIRCUITS	Doc. kind Circuit diagram; doc EFS; Ref Des. =4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev. nr. 00; Lang. en
Rev. Revision note Date Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA; Sheet 45; C. sheet 46
1MYN300439-CZA(A3)REV01			

Scanned with OKEN Scanner

+4BE2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BAY_408_R PHASE		-X411	1
AC FILTER-1	3IE		2
P40R4L01	CT: 1A		
BAY_408_Y PHASE		-X411	3
AC FILTER-1	3IE		4
P40R4L02	CT: 1A		
BAY_408_B PHASE		-X411	5
AC FILTER-1	3IE		6
P40R4L03	CT: 1A		
BAY_426_R PHASE		-X411	7
CONVERTOR POLE-1	3IE		8
P42R4L04	CT: 1A		
BAY_426_Y PHASE		-X411	9
CONVERTOR POLE-1	3IE		10
P42R4L05	CT: 1A		
BAY_426_B PHASE		-X411	11
CONVERTOR POLE-1	3IE		12
P42R4L06	CT: 1A		

2B101
2B201
2B151
2B171
2B131
2B181
2B191
2B161

-X01

+CT-MB
+BAY408 4 1 8
AC FILTER-1
TB-1
P1 P1 P1
13 14 17 18 21 22
151 152 153 151 152 153 151 152 153
P2 P2 P2
2IC07-CT1
CORE-1
CTR: 3000/1A
CLASS: PS

+CT-MB
+BAY426 4 2 1
CONVERTOR POLE-1
TB-1
P1 P1 P1
13 14 17 18 21 22
151 152 153 151 152 153 151 152 153
P2 P2 P2
2IC08-CT1
CORE-1
CTR: 3000/1A
CLASS: PS

REFER EXISTING DWG:
YN1M300439-CZA,
SH:021_2,021_4

Based on 3100135053				Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RFB670 RELAY M1-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Ref Des =4R
				Approved 20.04.2023 DEENADAYALAN A		Doc dept PG-GAS	Rev. ind. 00 Language en
				Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and System India Limited)	Doc no 1MNS801837-CGCA	Sheet 46 / Subsheet 47
Rev.	Revs on note	Date	Name				

1MYN09 003-IC2(AS)REV01

Scanned with OKEN Scanner

Execution 3100135053	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 CT CIRCUITS	Doc.kind. Circuit diagram	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		acc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. | Revision note | Date | Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 47
1MYN801003-102(A)IREV07					n. sheet 48

© 2023 Hitachi Energy. All rights reserved.

+4BB2

FROM SH: 006/2

-X13

-813-01

-813-02

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

PSM
-X11

90-250VDC

PE
/58.B1

K301
+D.11-D11.02:1P3
/49.A5

K302
+B.05-1XX2:1
/49.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.131.101

1B	1A	
2B	2A	
3B	3A	/44.A4
4B	4A	/44.B4
5B	5A	/44.B4
6B	6A	/44.B4
7B	7A	/44.D4
8B	8A	/44.D4
9B	9A	/44.E4
10B	10A	/44.E4
11B	11A	/45.A4
12B	12A	/45.B4
13B	13A	/45.B4
14B	14A	/45.B4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.143.101

1B	1A	
2B	2A	
3B	3A	/45.D4
4B	4A	/45.D4
5B	5A	/45.E4
6B	6A	/45.E4
7B	7A	/46.A4
8B	8A	/46.B4
9B	9A	/46.B4
10B	10A	/46.B4
11B	11A	/46.D4
12B	12A	/46.D4
13B	13A	/46.E4
14B	14A	/46.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.155.101

1B	1A	
2B	2A	
3B	3A	/47.A4
4B	4A	/47.B4
5B	5A	/47.B4
6B	6A	/47.B4
7B	7A	/47.D4
8B	8A	/47.D4
9B	9A	/47.E4
10B	10A	/47.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 023

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
	DCC EFS		
Resp. dept.	PG-GAS	Rev. ind.	01
Doc. no.	1MNS801837-CGCA	Language	en
		Sheet	48
		n. sheet	49

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

MAIN 1 BUS 2 PROT IN		-X31 1	K303
P3#BI.01	220-250VDC	/59.A2 2	
MAIN 1 BUS 2 PROT OUT		-X31 3	K304
P3#BI.02	220-250VDC	/59.B2 4	
SPARE		-X31 5	K305
P3#BI.03	220-250VDC	/59.B2 6	
TRIP RELAY RESET 96A BUS-2		-X31 7	K306
P3#BI.04	220-250VDC	/59.B2 8	
SPARE		-X31 9	K307
P3#BI.05	220-250VDC	/59.C2 10	
SPARE		-X31 11	K308
P3#BI.06	220-250VDC	/59.C2 12	
SPARE		-X31 13	K309
P3#BI.07	220-250VDC	/59.C2 14	
REB670 RELAY FAULTY BUS 2 - MAIN 2		-X31 15	K310
P3#BI.08	220-250VDC	/59.D2 16	

-1XX2 1

+D.05-D05.01:5 (-X11) /48.B2 K302

+D.05-D05.01:4 (-X11) /48.B2 K301

-D11.02
1P3 1P4 /49.B7 IN
BB-2 M1 IN/OUT SWITCH

-D11.02
1P2 /49.A7 OUT 1P1
BB-2 M1 IN/OUT SWITCH

-2X04
1 K301 /170.B8
2 K306 /170.A5 +D.13-D13.101.101:221
3
4
5
-X14A 1
-X14A 2

-D11.02
1P2 1P1 /49.B4 C
1P3 1P4 /49.B3 A
2P2 2P1 C
2P3 2P4 A
3P2 3P1 C
3P3 3P4 A
4P2 4P1 C
4P3 4P4 A
IN A
OUT C
BB-2 M1 IN/OUT SWITCH

+4BB6
+D.05
-X14A 1
-X14A 2
-X11 2
3
1
/130.B2
BB RELAY FAULTY
BUS-2 MAIN-2

NOTE:
2X04 TB GROUP
TO BE ADDED NEW

+B.05-1XX2:2 /50.A3 K302

+B.17-X04:13 /50.A5 K301

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

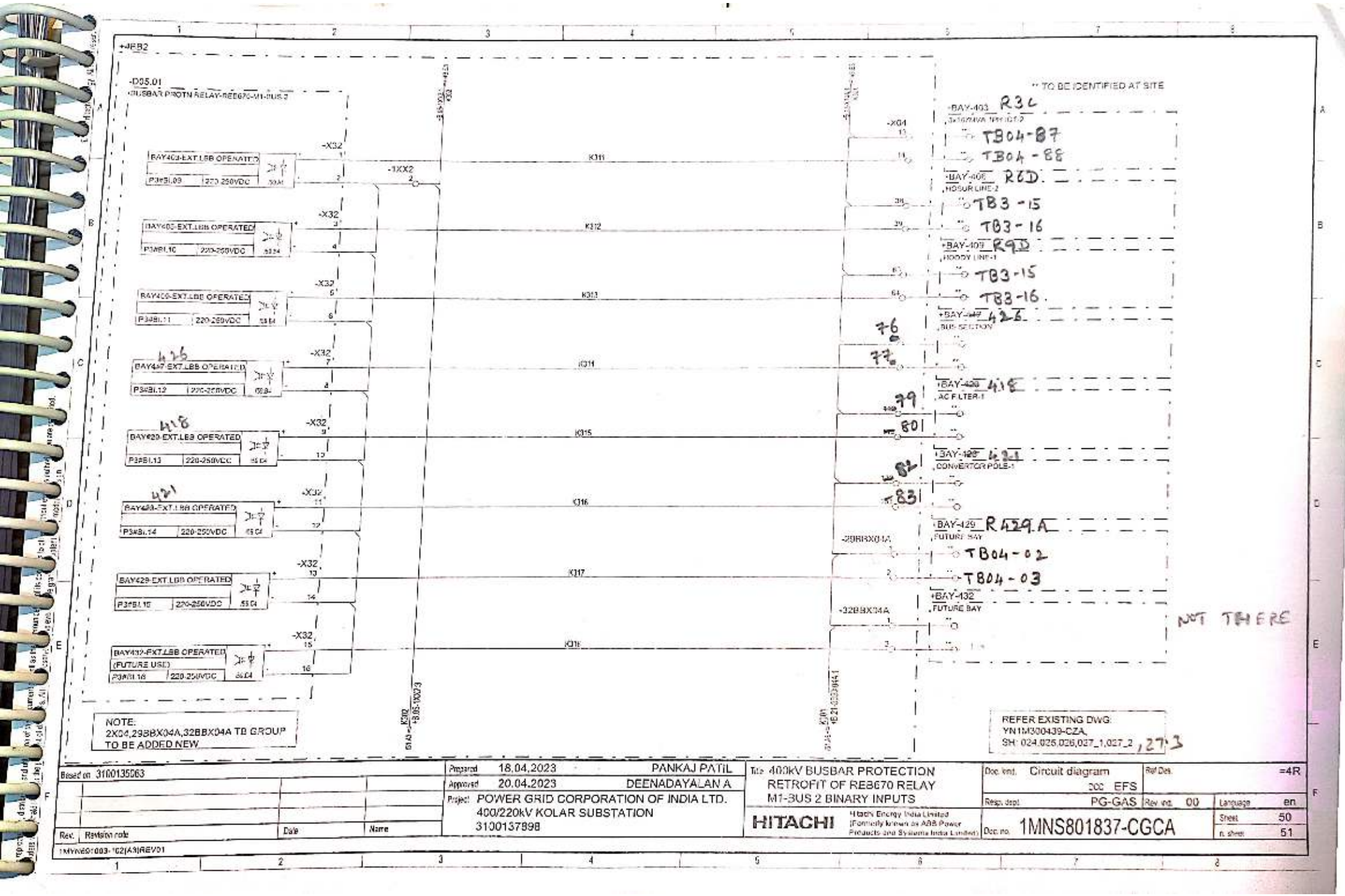
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

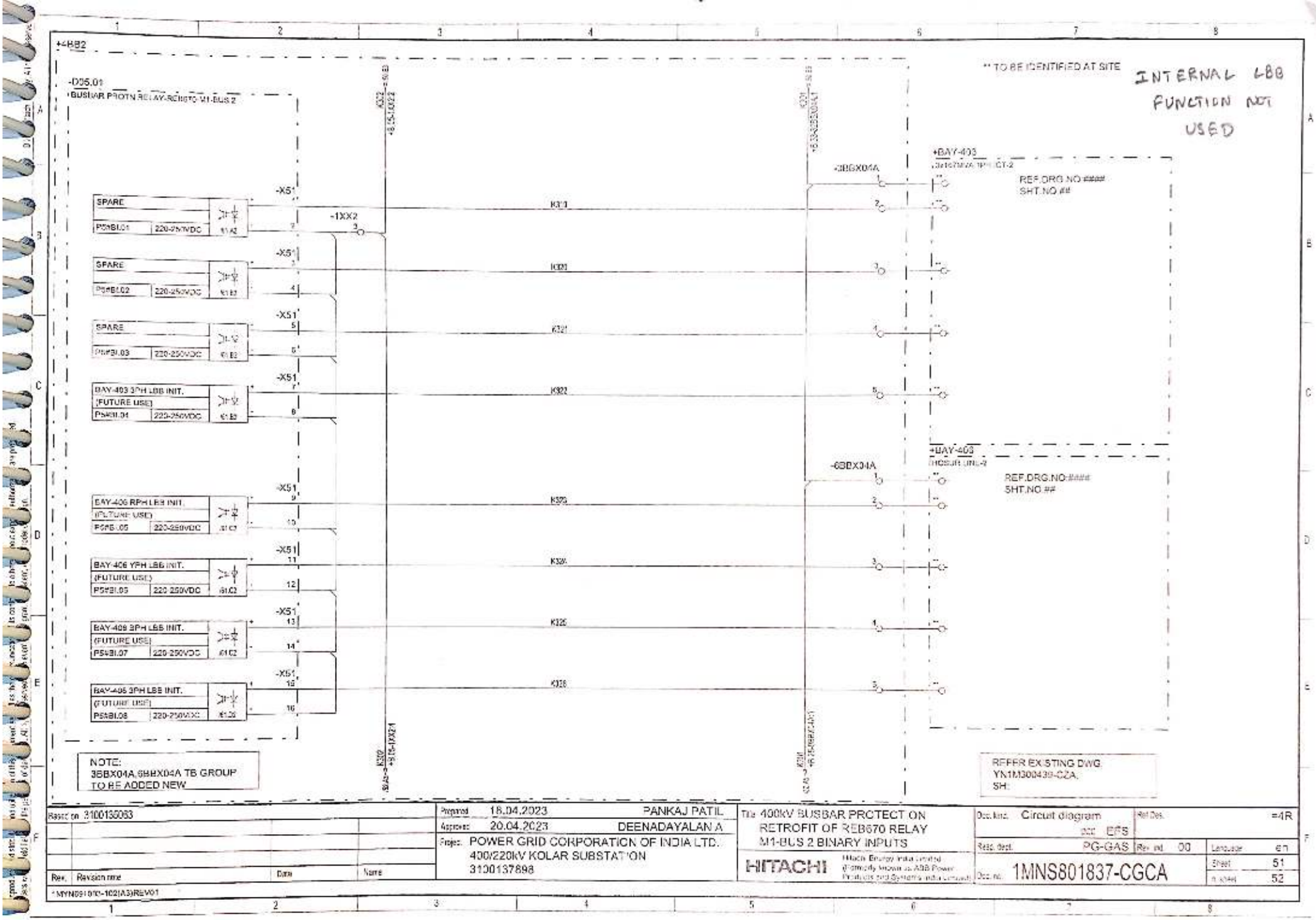
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

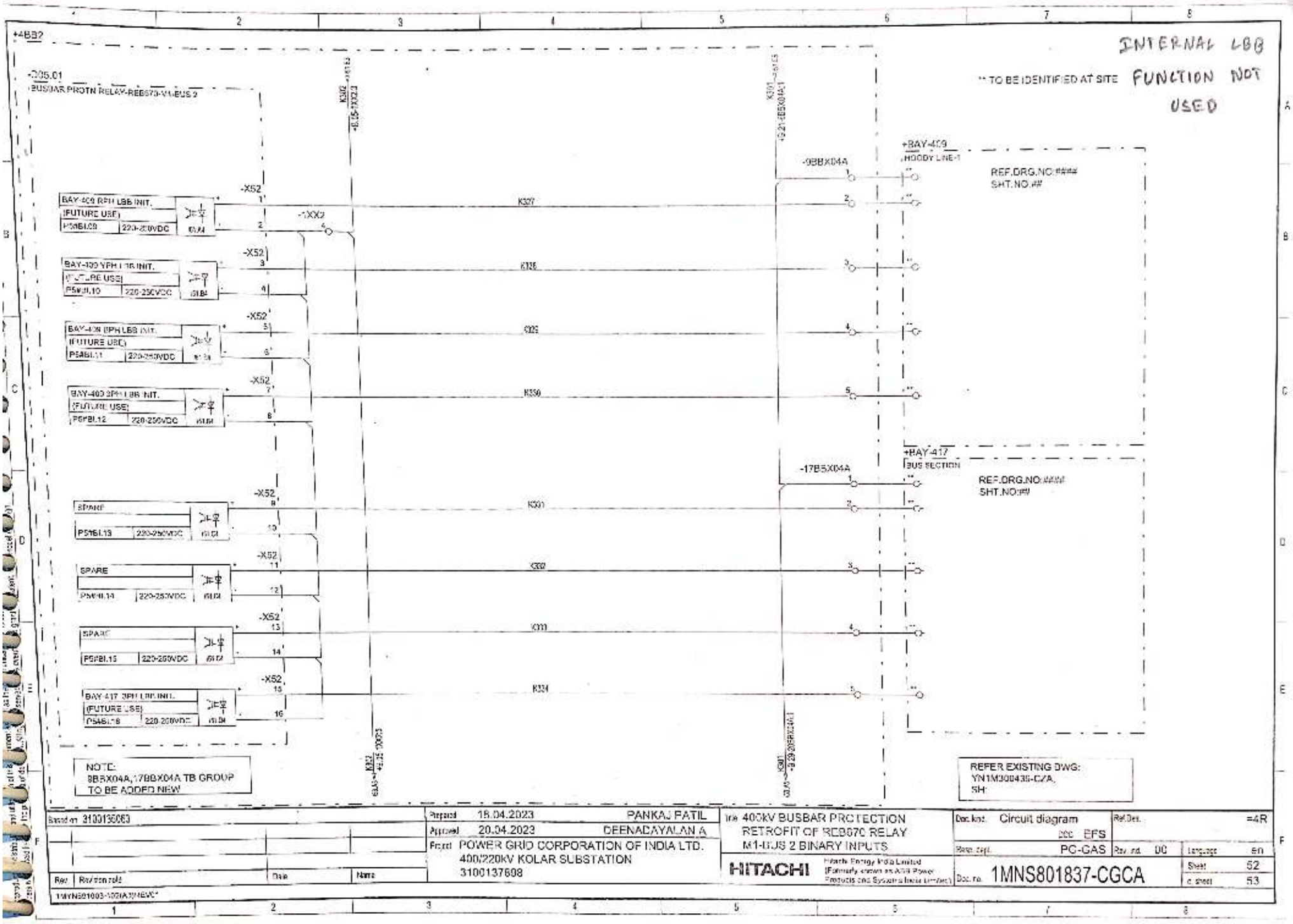
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 49
Doc. no. 1MNS801837-CGCA
n. sheet 50

1MYN691003-102(A3)REV01

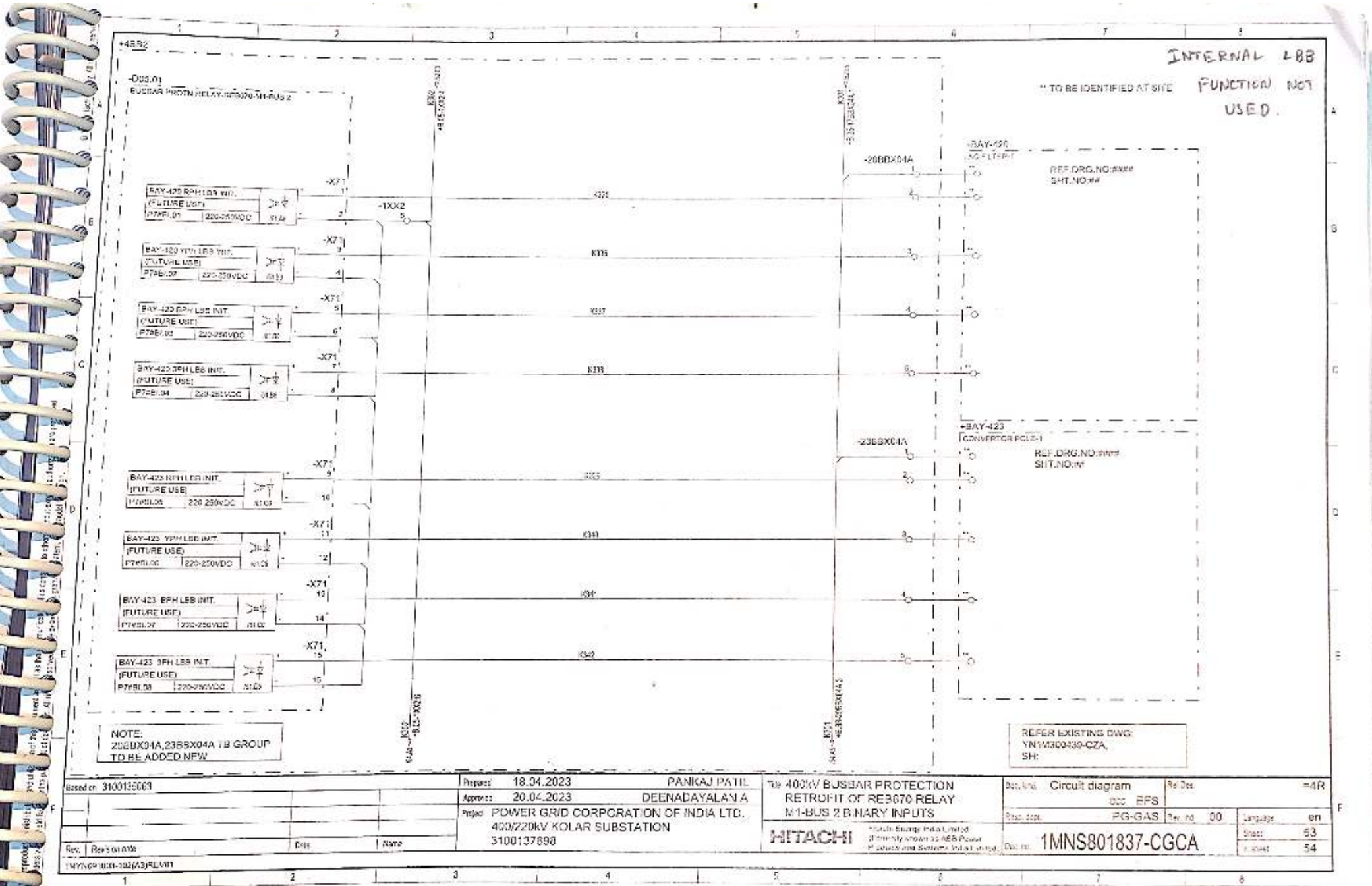

+JFB2
-D05.01
-BUSBAR PROTN RELAY-RE8670-M1-BUS 2
-X32
-1XX2
BAY403-EXT.LBB OPERATED
BAY402-EXT.LBB OPERATED
BAY401-EXT.LBB OPERATED
BAY427-EXT.LBB OPERATED
BAY428-EXT.LBB OPERATED
BAY429-EXT.LBB OPERATED
BAY432-EXT.LBB OPERATED
(FUTURE USE)
P3#BI.09
P3#BI.10
P3#BI.11
P3#BI.12
P3#BI.13
P3#BI.14
P3#BI.15
P3#BI.16
220-250VDC
K311
K312
K313
K314
K315
K316
K317
K318
** TO BE IDENTIFIED AT SITE
-BAY-403 R3C
TB04-87
TB04-88
-BAY-402 R2D
HOSUR LINE-2
TB3-15
TB3-16
-BAY-401 R1D
HOODY LINE-1
TB3-15
TB3-16
-BAY-427 426
BUS SECTION
-BAY-428 418
AC FILTER-1
-BAY-429 421
CONVERTOR POLE-1
-BAY-429 R429A
FUTURE BAY
TB04-02
TB04-03
-29BBX04A
-BAY-432
FUTURE BAY
-32BBX04A
NOT THERE
NOTE:
2X04,29BBX04A,32BBX04A TB GROUP
TO BE ADDED NEW
REFER EXISTING DWG:
YN1M300439-CZA_
SH: 024,025,026,027_1,027_2
Based on 3100135063
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project: POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137998
Title: 400kV BUSBAR PROTECTION
RETROFIT OF RE8670 RELAY
M1-BUS 2 BINARY INPUTS
HITACHI
Hitachi Energy India Limited
(Formerly known as ABB Power
Products and Systems India Limited)
Doc kind: Circuit diagram
200 EFS
Ref Des. =4R
Resp. dept. PG-GAS
Rev. ind. 00
Language en
Doc. no. 1MNS801837-CGCA
Sheet 50
n. sheet 51
Rev. Revision note
Date
Name
1MYW601003-1C2(A3)REV01



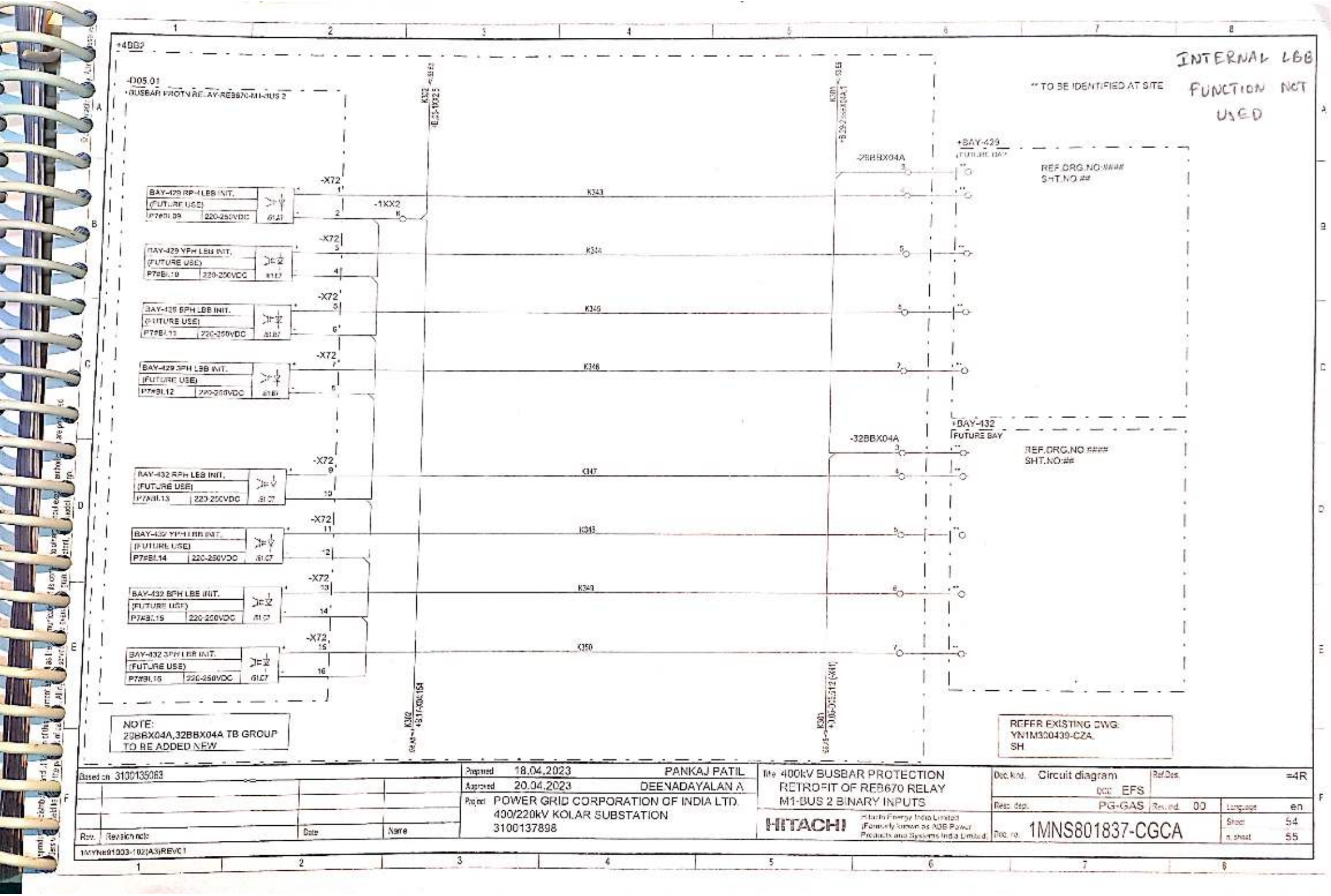
Scanned with OKEN Scanner



Scanned with OKEN Scanner

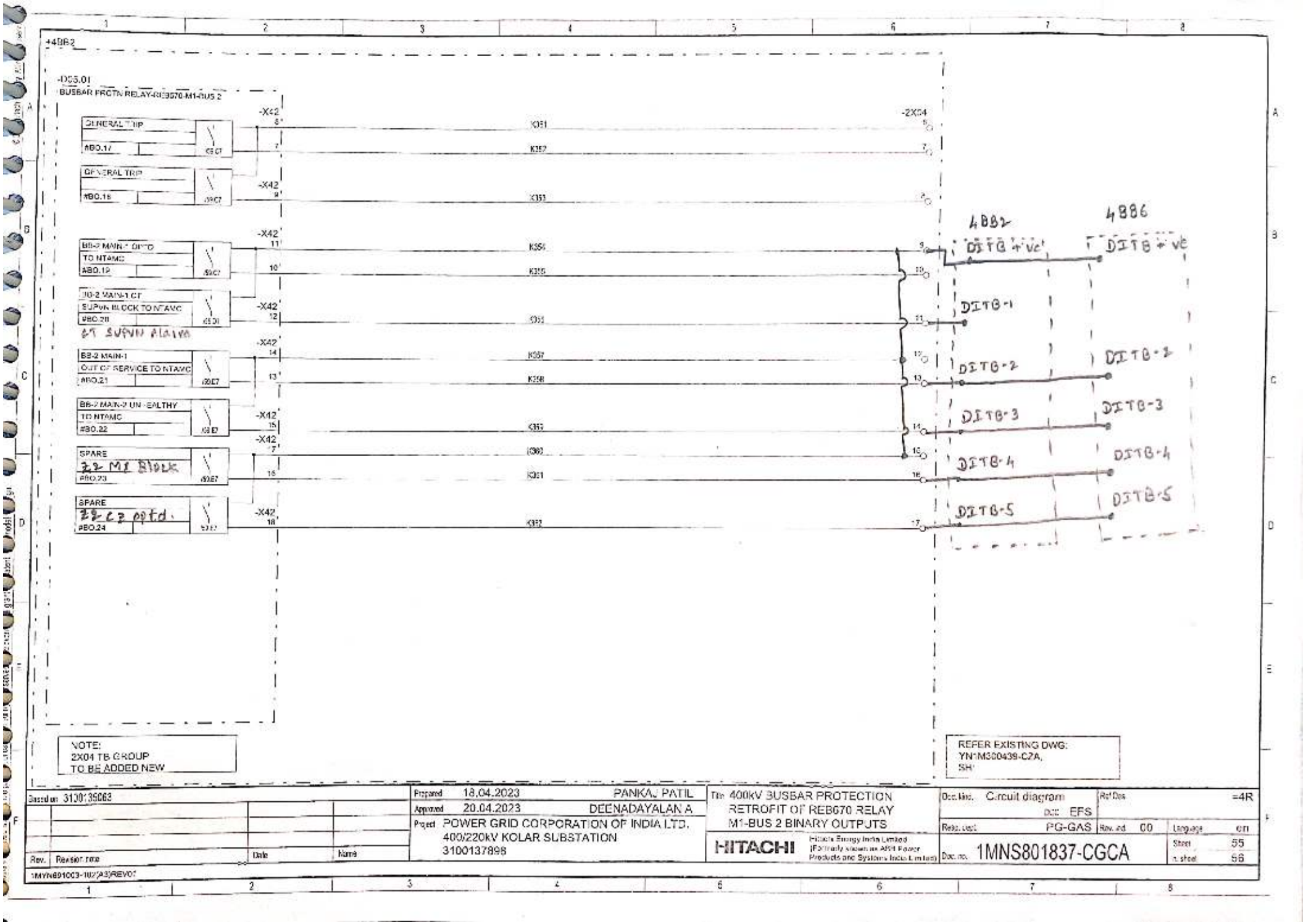


Scanned with OKEN Scanner

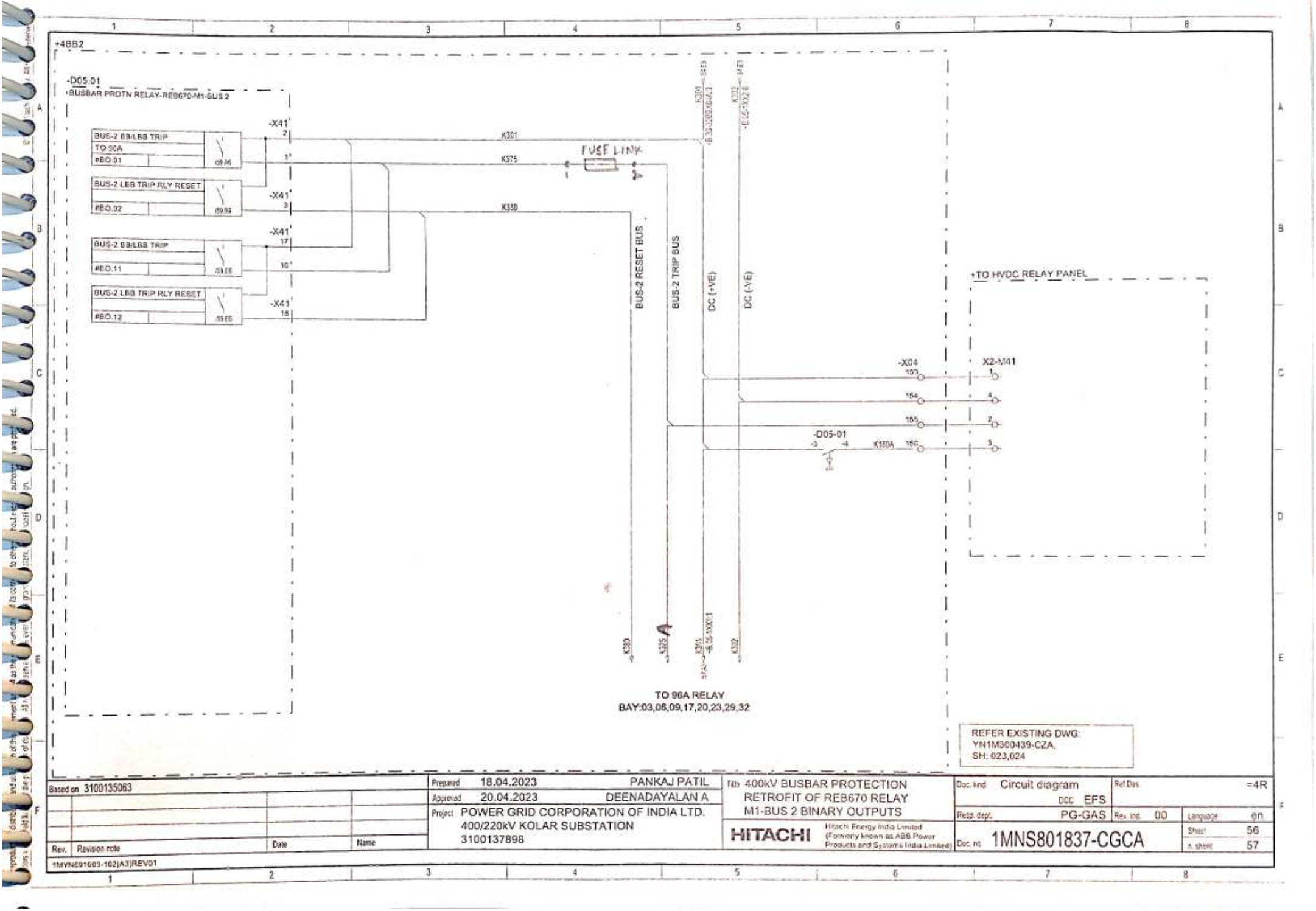


Based on 3100135083	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RE8670 RELAY M1-BUS 2 BINARY INPUTS	Doc.kind. Circuit diagram; doc. EFS; Ref.Des. =4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev.ind. 00; Language en
Rev. Revision note Date Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA; Sheet 54; n. sheet 55
1MYNe81033-102(A3)REV01			

Scanned with OKEN Scanner



Scanned with OKEN Scanner



Based on 3100135063			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 BINARY OUTPUTS	Doc. kind Circuit diagram DCC EFS	Ref Des	=4R
			Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. nr. 1MNS801837-CGCA		Sheet 56
Rev.	Revision note	Date	Name				n. sheet 57

1MYN691603-102(A3)REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BAY-403 LBB RETRIP-M1	#BO.03	/59.B6	-X41 5	-1XX1 1	2P13
			-X41 4		
BAY-406 RPH LBB RETRIP-M1	#BO.04	/59.C6	-X41 6		2P15
BAY-406 YPH LBB RETRIP-M1	#BO.05	/59.C6	-X41 8		2P17
			-X41 7		
BAY-406 BPH LBB RETRIP-M1	#BO.06	/59.C6	-X41 9		2P19
BAY-409 RPH LBB RETRIP-M1	#BO.07	/59.C6	-X41 11	-1XX1 2	2P21
			-X41 10		
BAY-409 YPH LBB RETRIP-M1	#BO.08	/59.D6	-X41 12		2P23
BAY-409 BPH LBB RETRIP-M1	#BO.09	/59.D6	-X41 14		2P25
			-X41 13		
BAY-417 LBB RETRIP-M1	#BO.10	/59.E6	-X41 15		2P27

K301 /56.E5 -D05-01:-3

-2X04 18 19 20 21 22 23 24 25

NOTE:
1XX1, 2X04 TB GROUP
TO BE ADDED NEW

K301 /57.A6 +B.05-1XX1:3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BAY-420 RPH LBB RETRIP-M1	#BO.01	/60.A2	-X61 2	-1XX1 3	2P29
			-X61 1		
BAY-420 YPH LBB RETRIP-M1	#BO.02	/60.B2	-X61 3		2P31
BAY-420 BPH LBB RETRIP-M1	#BO.03	/60.B2	-X61 5		2P33
			-X61 4		
BAY-423 RPH LBB RETRIP-M1	#BO.04	/60.C2	-X61 6		2P35
BAY-423 YPH LBB RETRIP-M1	#BO.05	/60.C2	-X61 8	-1XX1 4	2P37
			-X61 7		
BAY-423 BPH LBB RETRIP-M1	#BO.06	/60.C2	-X61 9		2P39
BAY-420 BPH LBB RETRIP-M1	#BO.07	/60.C2	-X61 11		2P41
			-X61 10		
BAY-429 RPH LBB RETRIP-M1	#BO.08	/60.D2	-X61 12		2P43
BAY-429 YPH LBB RETRIP-M1	#BO.09	/60.D2	-X61 14	-1XX1 5	2P45
			-X61 13		
BAY-429 BPH LBB RETRIP-M1	#BO.10	/60.E2	-X61 15		2P47
BAY-432 RPH LBB RETRIP-M1	#BO.11	/60.E2	-X61 17		2P49
			-X61 16		
BAY-432 YPH LBB RETRIP-M1	#BO.12	/60.E2	-X61 18		2P51
BAY-432 BPH LBB RETRIP-M1	#BO.13	/60.A4	X62 2	-1XX1 6	2P53
			X62 1		

K301 /57.E3 +B.05-1XX1:2

-2X04 26 27 28 29 30 31 32 33 34 35 36 37 38

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 57
n. sheet 58
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
PSM
90-250VDC

-X11

4 +
5 -
/48.B3
90-250VDC
PE

-X11
2
3 /121.E7
1

BUSBAR RELAY FAULTY
BUS-2 MAIN1

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
TRM
1A, 50/60Hz

-X401

BAY_403_R PHASE 400/220/33kV ICT-2 P40#AI.01 CT: 1A	+ 1 - 2	/44.A2	BAY_420_R PHASE AC FILTER-1 P40#AI.01 CT: 1A	+ 1 - 2	/46.A2
BAY_403_Y PHASE 400/220/33kV ICT-2 P40#AI.02 CT: 1A	+ 3 - 4	/44.B2	BAY_420_Y PHASE AC FILTER-1 P40#AI.02 CT: 1A	+ 3 - 4	/46.B2
BAY_403_B PHASE 400/220/33kV ICT-2 P40#AI.03 CT: 1A	+ 5 - 6	/44.B2	BAY_420_B PHASE AC FILTER-1 P40#AI.03 CT: 1A	+ 5 - 6	/46.B2
BAY_406_R PHASE HOSUR LINE-2 P40#AI.04 CT: 1A	+ 7 - 8	/44.D2	BAY_423_R PHASE CONVERTOR POLE-1 P40#AI.04 CT: 1A	+ 7 - 8	/46.D2
BAY_406_Y PHASE HOSUR LINE-2 P40#AI.05 CT: 1A	+ 9 - 10	/44.D2	BAY_423_Y PHASE CONVERTOR POLE-1 P40#AI.05 CT: 1A	+ 9 - 10	/46.D2
BAY_406_B PHASE HOSUR LINE-2 P40#AI.06 CT: 1A	+ 11 - 12	/44.E2	BAY_423_B PHASE CONVERTOR POLE-1 P40#AI.06 CT: 1A	+ 11 - 12	/46.E2
BAY_409_R PHASE HOODY LINE-1 P40#AI.07 CT: 1A	+ 13 - 14	/45.A2	BAY_429_R PHASE FUTURE BAY P40#AI.07 CT: 1A	+ 13 - 14	/47.A2
BAY_409_Y PHASE HOODY LINE-1 P40#AI.08 CT: 1A	+ 15 - 16	/45.B2	BAY_429_Y PHASE FUTURE BAY P40#AI.08 CT: 1A	+ 15 - 16	/47.B2
BAY_409_B PHASE HOODY LINE-1 P40#AI.09 CT: 1A	+ 17 - 18	/45.B2	BAY_429_B PHASE FUTURE BAY P40#AI.09 CT: 1A	+ 17 - 18	/47.B2
BAY_417_R PHASE BUS SECTION P40#AI.10 CT: 1A	+ 19 - 20	/45.D2	BAY_432_R PHASE FUTURE BAY P40#AI.10 CT: 1A	+ 19 - 20	/47.D2
BAY_417_Y PHASE BUS SECTION P40#AI.11 CT: 1A	+ 21 - 22	/45.D2	BAY_432_Y PHASE FUTURE BAY P40#AI.11 CT: 1A	+ 21 - 22	/47.D2
BAY_417_B PHASE BUS SECTION P40#AI.12 CT: 1A	+ 23 - 24	/45.E2	BAY_432_B PHASE FUTURE BAY P40#AI.12 CT: 1A	+ 23 - 24	/47.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
TRM
1A, 50/60Hz

-X411

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

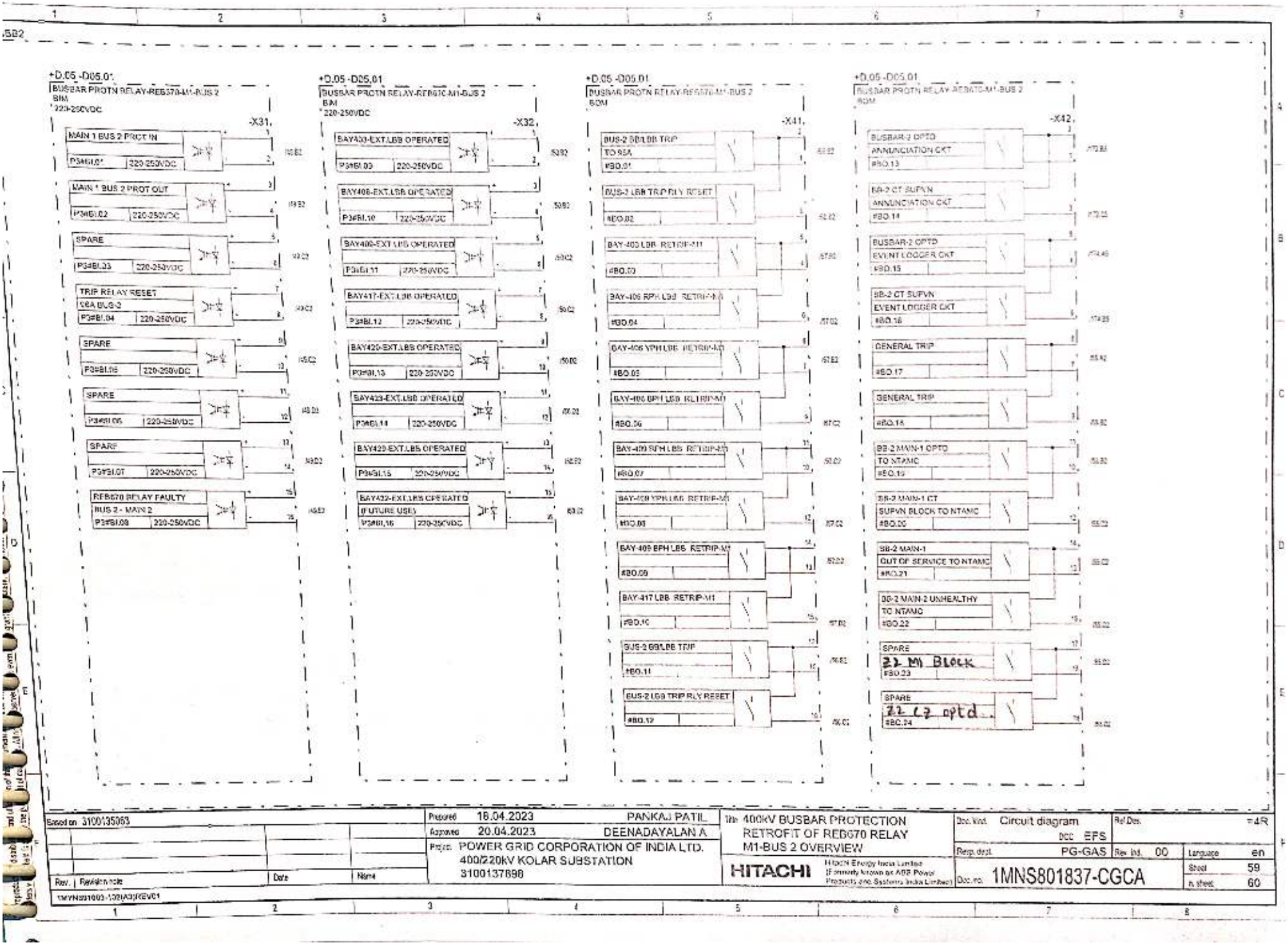
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	58
		n. sheet	59

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW	Doc. kind Circuit diagram	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		Doc. EFS		
	Proj.no. POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp.dept. PG-GAS	Rev.ind. 00	Language en
			Doc.no. 1MNS801837-CGCA	Sheet 59	
Rev. Revision note Date Name				n.sheet 60	

1MYN301003-1001/A3/REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
BOM

-X61

BAY-420 RPH LBB RETRIP-M1	#BO.01	2 / 1	/57.B5
BAY-420 YPH LBB RETRIP-M1	#BO.02	3	/57.B5
BAY-420 BPH LBB RETRIP-M1	#BO.03	5 / 4	/57.B5
BAY-423 RPH LBB RETRIP-M1	#BO.04	6	/57.C5
BAY-423 YPH LBB RETRIP-M1	#BO.05	8 / 7	/57.C5
BAY-423 BPH LBB RETRIP-M1	#BO.06	9	/57.C5
BAY-420 BPH LBB RETRIP-M1	#BO.07	11 / 10	/57.D5
BAY-429 RPH LBB RETRIP-M1	#BO.08	12	/57.D5
BAY-429 YPH LBB RETRIP-M1	#BO.09	14 / 13	/57.D5
BAY-429 BPH LBB RETRIP-M1	#BO.10	15	/57.E5
BAY-432 RPH LBB RETRIP-M1	#BO.11	17 / 16	/57.E5
BAY-432 YPH LBB RETRIP-M1	#BO.12	18	/57.E5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
BOM

X62

BAY-432 BPH LBB RETRIP-M1	#BO.13	2 / 1	/57.F5
SPARE	#BO.14	3	
BUSBAR-2 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/174.B6
BB-2 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/174.B6
SPARE	#BO.17	8 / 7	
SPARE	#BO.18	9	
SPARE	#BO.19	11 / 10	
SPARE	#BO.20	12	
SPARE	#BO.21	14 / 13	
SPARE	#BO.22	15	
SPARE	#BO.23	17 / 16	
SPARE	#BO.24	18	

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 60
n. sheet 61

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X51

SPARE		+ 1		
P5#BI.01	220-250VDC	- 2	/51.B2	
SPARE		+ 3		
P5#BI.02	220-250VDC	- 4	/51.B2	
SPARE		+ 5		
P5#BI.03	220-250VDC	- 6	/51.C2	
BAY-403 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P5#BI.04	220-250VDC	- 8	/51.C2	
BAY-406 RPH LBB INIT.		+ 9		
(FUTURE USE)				
P5#BI.05	220-250VDC	- 10	/51.D2	
BAY-406 YPH LBB INIT.		+ 11		
(FUTURE USE)				
P5#BI.06	220-250VDC	- 12	/51.D2	
BAY-406 BPH LBB INIT.		+ 13		
(FUTURE USE)				
P5#BI.07	220-250VDC	- 14	/51.E2	
BAY-406 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P5#BI.08	220-250VDC	- 16	/51.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X52

BAY-409 RPH LBB INIT.		+ 1		
(FUTURE USE)				
P5#BI.09	220-250VDC	- 2	/52.B2	
BAY-409 YPH LBB INIT.		+ 3		
(FUTURE USE)				
P5#BI.10	220-250VDC	- 4	/52.B2	
BAY-409 BPH LBB INIT.		+ 5		
(FUTURE USE)				
P5#BI.11	220-250VDC	- 6	/52.C2	
BAY-409 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P5#BI.12	220-250VDC	- 8	/52.C2	
SPARE		+ 9		
P5#BI.13	220-250VDC	- 10	/52.D2	
SPARE		+ 11		
P5#BI.14	220-250VDC	- 12	/52.D2	
SPARE		+ 13		
P5#BI.15	220-250VDC	- 14	/52.E2	
BAY-417 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P5#BI.16	220-250VDC	- 16	/52.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X71

BAY-420 RPH LBB INIT.		+ 1		
(FUTURE USE)				
P7#BI.01	220-250VDC	- 2	/53.B2	
BAY-420 YPH LBB INIT.		+ 3		
(FUTURE USE)				
P7#BI.02	220-250VDC	- 4	/53.B2	
BAY-420 BPH LBB INIT.		+ 5		
(FUTURE USE)				
P7#BI.03	220-250VDC	- 6	/53.C2	
BAY-420 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P7#BI.04	220-250VDC	- 8	/53.C2	
BAY-423 RPH LBB INIT.		+ 9		
(FUTURE USE)				
P7#BI.05	220-250VDC	- 10	/53.D2	
BAY-423 YPH LBB INIT.		+ 11		
(FUTURE USE)				
P7#BI.06	220-250VDC	- 12	/53.D2	
BAY-423 BPH LBB INIT.		+ 13		
(FUTURE USE)				
P7#BI.07	220-250VDC	- 14	/53.E2	
BAY-423 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P7#BI.08	220-250VDC	- 16	/53.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X72

BAY-429 RPH LBB INIT.		+ 1		
(FUTURE USE)				
P7#BI.09	220-250VDC	- 2	/54.B2	
BAY-429 YPH LBB INIT.		+ 3		
(FUTURE USE)				
P7#BI.10	220-250VDC	- 4	/54.B2	
BAY-429 BPH LBB INIT.		+ 5		
(FUTURE USE)				
P7#BI.11	220-250VDC	- 6	/54.C2	
BAY-429 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P7#BI.12	220-250VDC	- 8	/54.C2	
BAY-432 RPH LBB INIT.		+ 9		
(FUTURE USE)				
P7#BI.13	220-250VDC	- 10	/54.D2	
BAY-432 YPH LBB INIT.		+ 11		
(FUTURE USE)				
P7#BI.14	220-250VDC	- 12	/54.D2	
BAY-432 BPH LBB INIT.		+ 13		
(FUTURE USE)				
P7#BI.15	220-250VDC	- 14	/54.E2	
BAY-432 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P7#BI.16	220-250VDC	- 16	/54.E2	

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

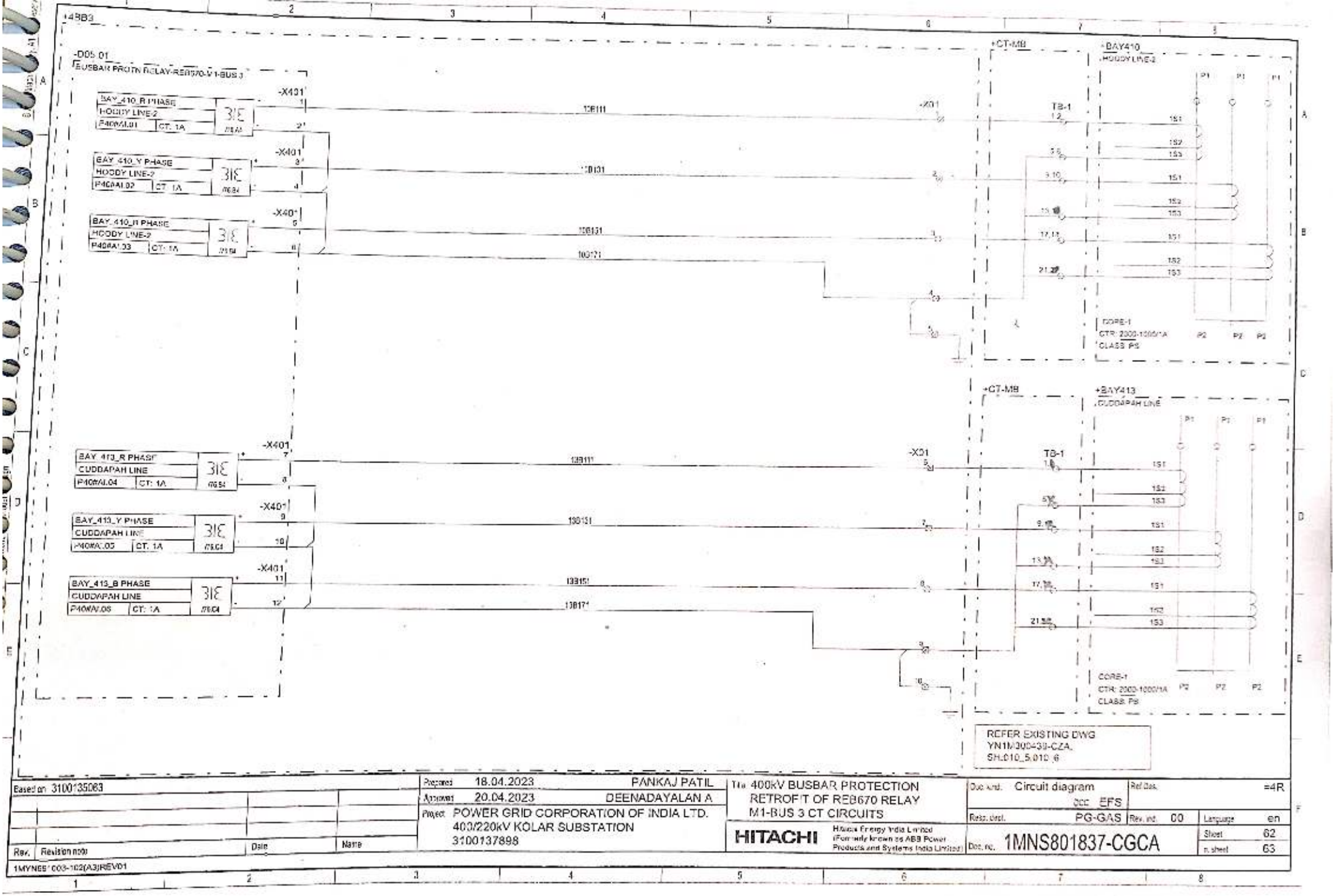
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 61
n. sheet 62

1MYN691003-102(A3)REV01

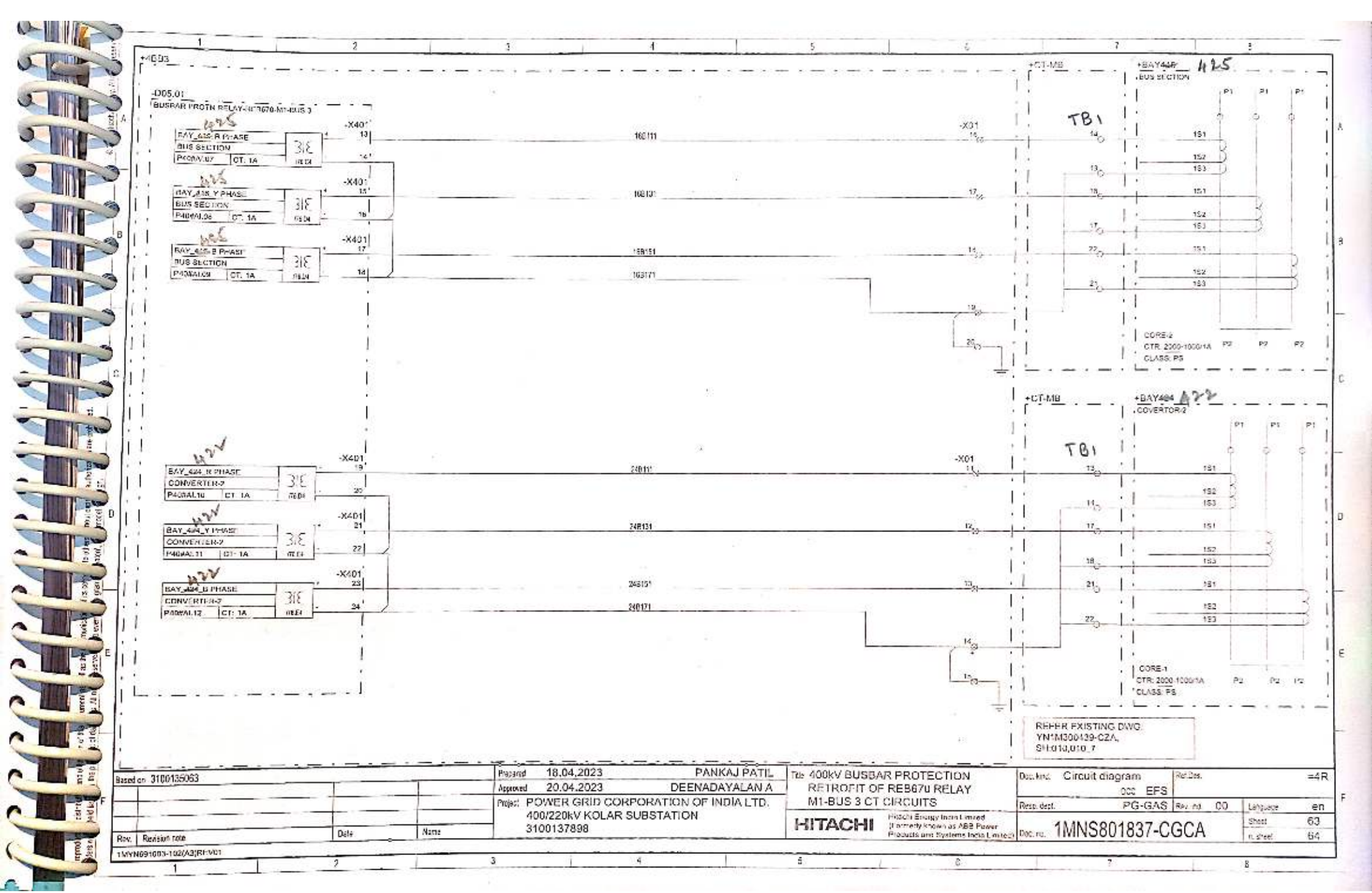
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



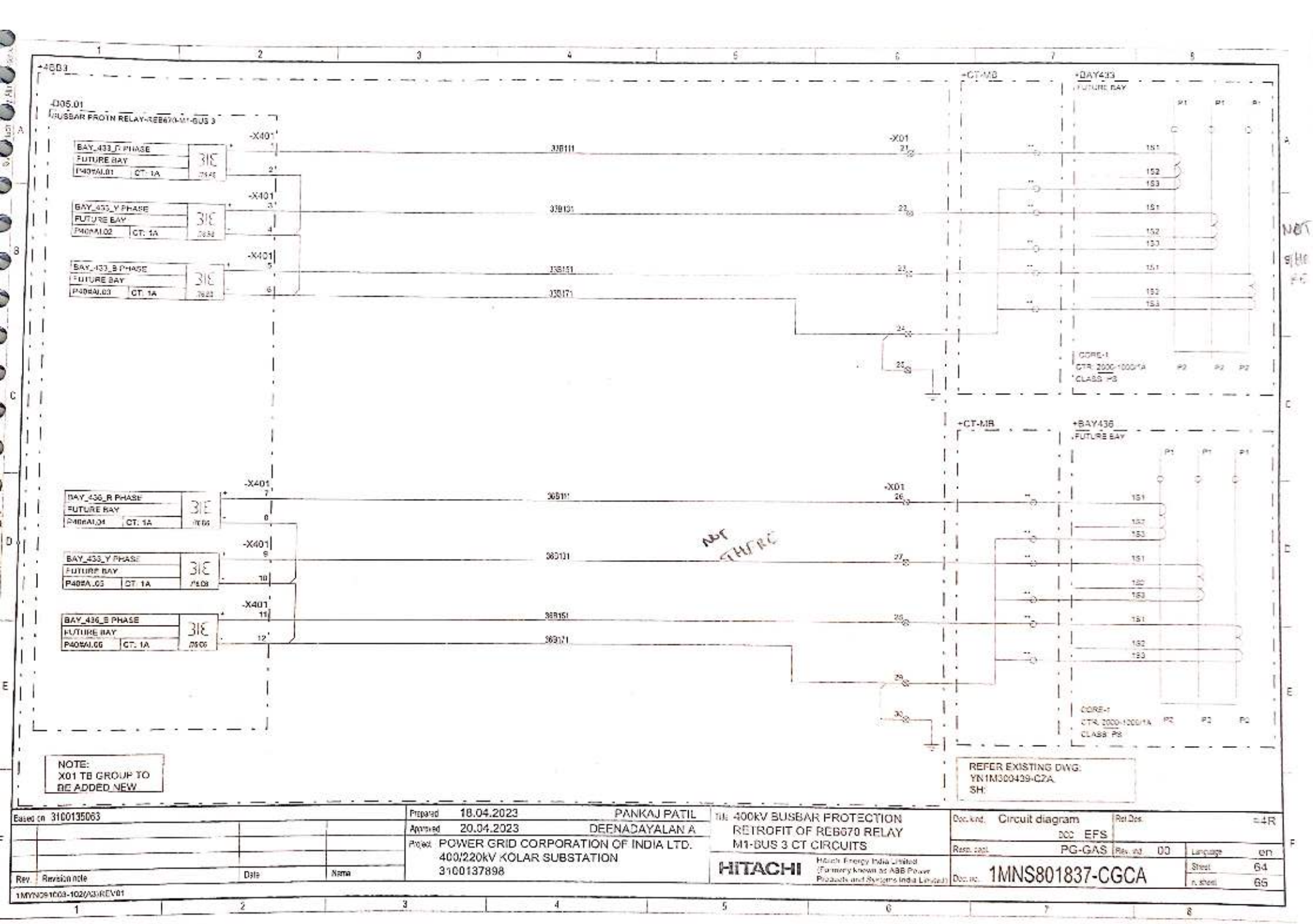
Based on 3100135083			Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 CT CIRCUITS	Doc kind Circuit diagram	Ref des. =4R
			Approved 20.04.2023	DEENADAYALAN A		acc. EFS	
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp. dept. PG-GAS	Rev. ind. 00
Rev.	Revision note	Date	Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Language en
							Sheet 62
							n. sheet 63

1MYN5**003-102(A3)REV01

Scanned with OKEN Scanner

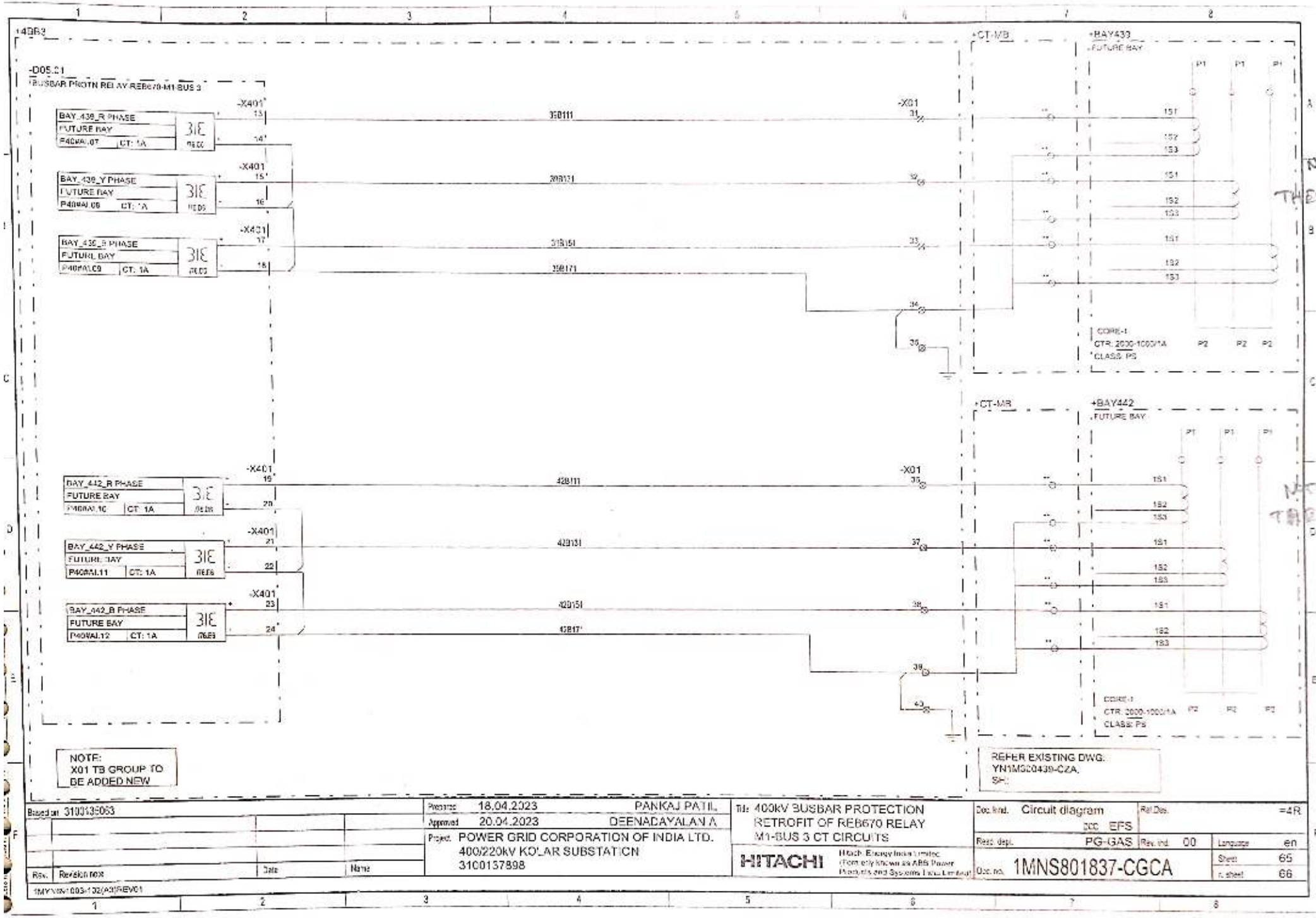


Scanned with OKEN Scanner



Based on 3100135063			Prepared 18.04.2023 PANKAJ PATIL	TIE 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 CT CIRCUITS	Doc.kind. Circuit diagram DOC EFS	Ref.Des.	=4R
			Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc.no. 1MNS801837-CGCA		Sheet 64 / n.sheet 65
Rev.	Revision note	Date	Name				

1MYN291009-102/A3/REV01



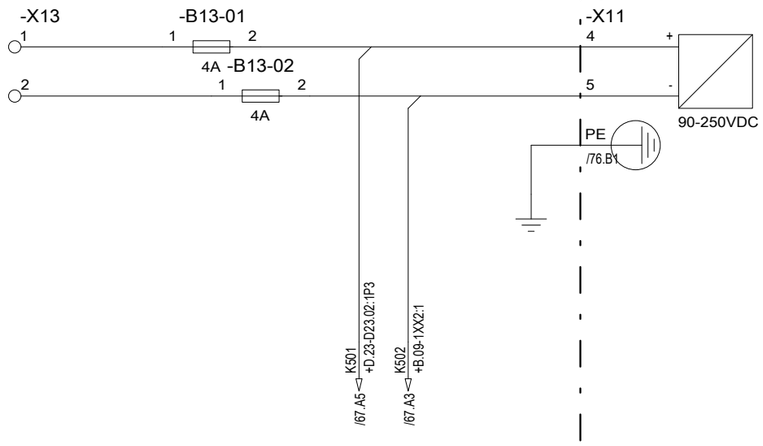
Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB3

FROM SH: 006/2

-X13 -B13-01 -B13-02



-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

PSM
-X11

K501 +D.23-D23.02:1P3 /67.A5

K502 +B.09-1XX2:1 /67.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
SFP

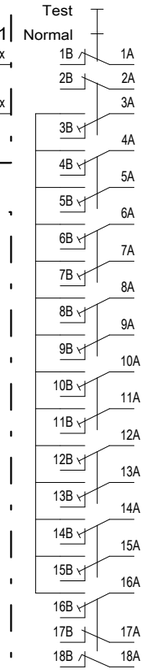
-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

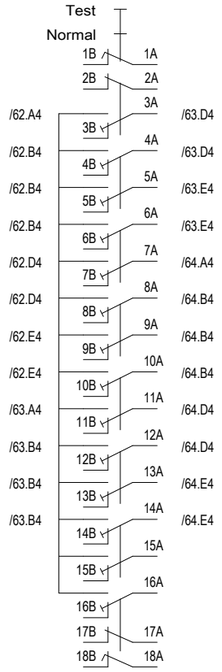
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

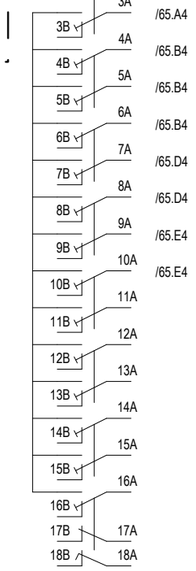
-D21.101.101



-D21.113.101



-D21.155.101



/62.A4 /62.B4 /62.B4 /62.B4 /62.D4 /62.D4 /62.E4 /62.E4 /63.A4 /63.B4 /63.B4 /63.B4

/63.D4 /63.D4 /63.E4 /63.E4 /64.A4 /64.B4 /64.B4 /64.B4 /64.D4 /64.D4 /64.E4 /64.E4

/65.A4 /65.B4 /65.B4 /65.B4 /65.D4 /65.D4 /65.E4 /65.E4

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 012

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 66
n. sheet 67

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

MAIN 1 BUS 3PROT IN		-X31	1	/77.A2
P3#BI.01	220-250VDC		2	
MAIN 1 BUS 3 PROT OUT		-X31	3	/77.B2
P3#BI.02	220-250VDC		4	
SPARE		-X31	5	/77.B2
P3#BI.03	220-250VDC		6	
TRIP RELAY RESET		-X31	7	/77.B2
96A BUS-3				
P3#BI.04	220-250VDC		8	
SPARE		-X31	9	/77.C2
P3#BI.05	220-250VDC		10	
SPARE		-X31	11	/77.C2
P3#BI.06	220-250VDC		12	
SPARE		-X31	13	/77.C2
P3#BI.07	220-250VDC		14	
REB670 RELAY FAULTY		-X31	15	/77.D2
BUS 3 - MAIN 2				
P3#BI.08	220-250VDC		16	

NOTE:
3X04 TB GROUP
TO BE ADDED NEW

+D.05-D05.01:5 (-X11) /66.B2 K502
+D.05-D05.01:4 (-X11) /66.B2 K501

K503 -1XX2 1
-D23.02 1P3 1P4 /67.A7 IN
BB-3 M1 IN/OUT SWITCH

K504
-D23.02 1P2 /67.A7 OUT 1P1
BB-3 M1 IN/OUT SWITCH

K505 -3X04 1
K501 /170.E4
K506 /170.D1
+D.13-D13.101.101:221
-3X04 2
K507 3
K508 4
K509 5
K510 -X14A 1, 2

-D23.02
1P2 /67.B4
1P1 C 1P3
1P4 /67.B3
A
2P2 2P1 C 2P3 2P4 A
3P2 3P1 C 3P3 3P4 A
4P2 4P1 C 4P3 4P4 A
IN A
OUT C
BB-3 M1 IN/OUT SWITCH

+4BB7
+D.05
-X14A 1 2
-X11 2 3 1
/148.B2
BUSBAR RELAY FAULTY
BUS-3 MAIN-2

+B.09-1XX2:2 K502 /68.A3
+B.33-X04:13 K501 /68.A5

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

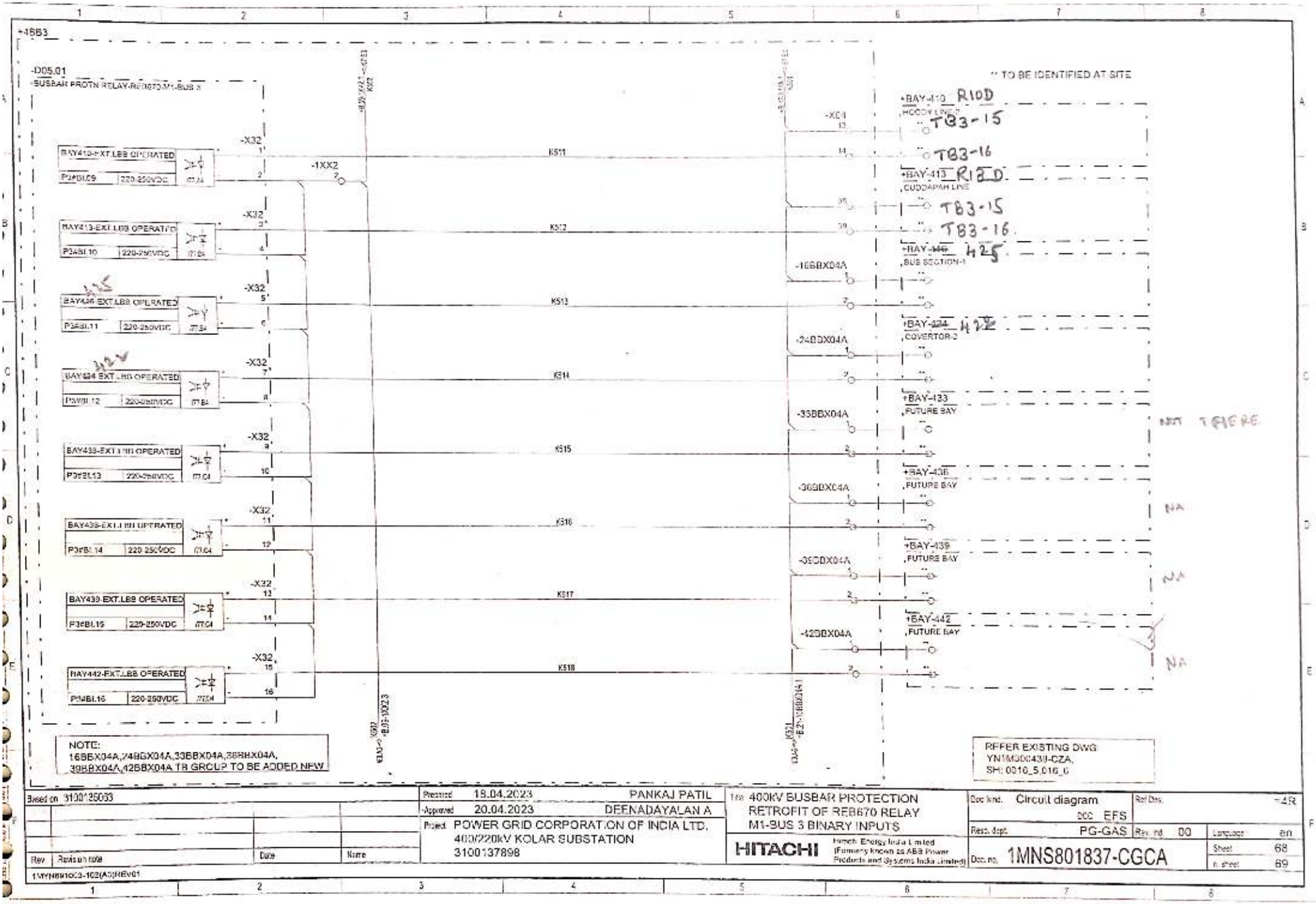
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 67
n. sheet 68

1MYN691003-102(A3)REV01

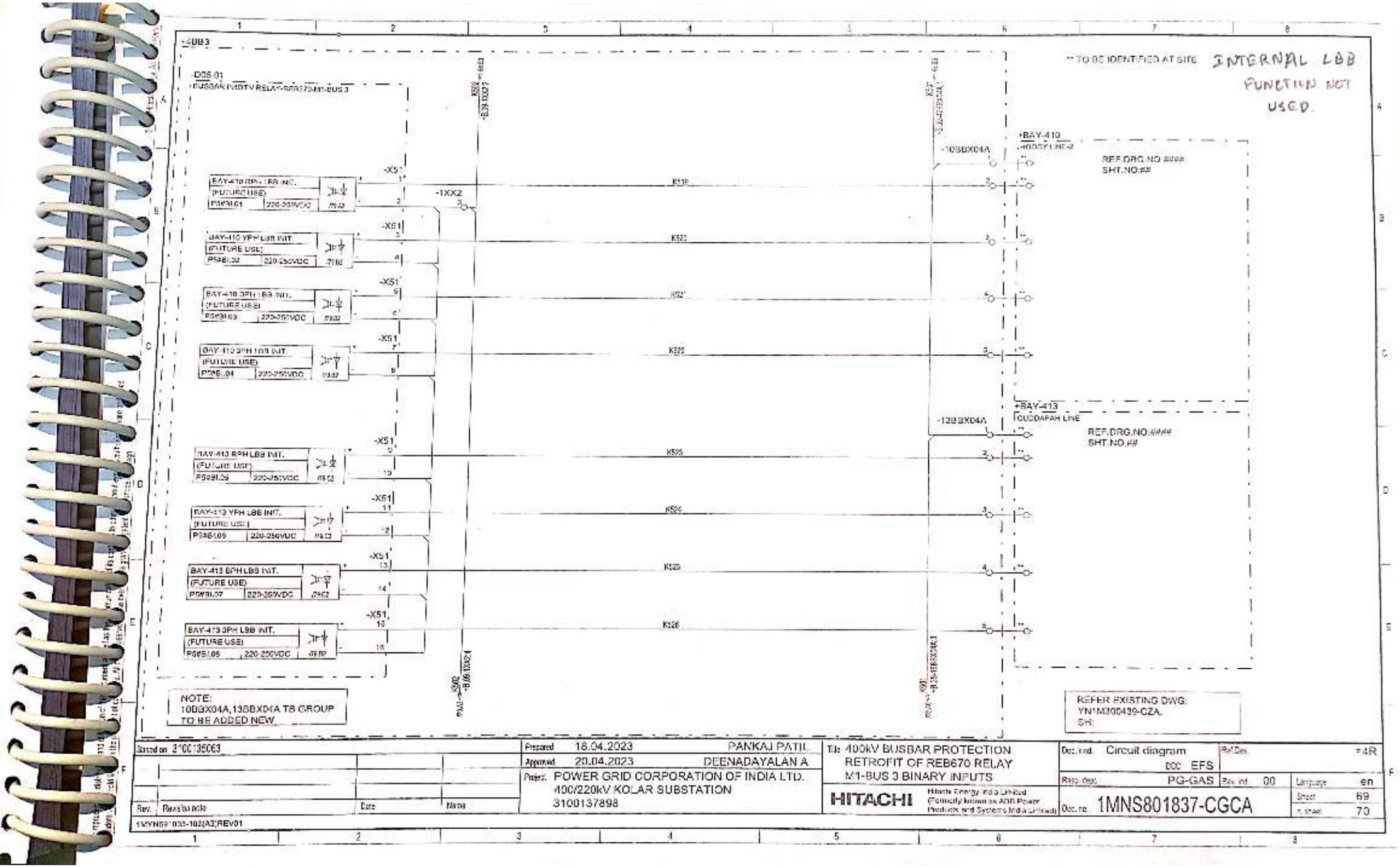
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



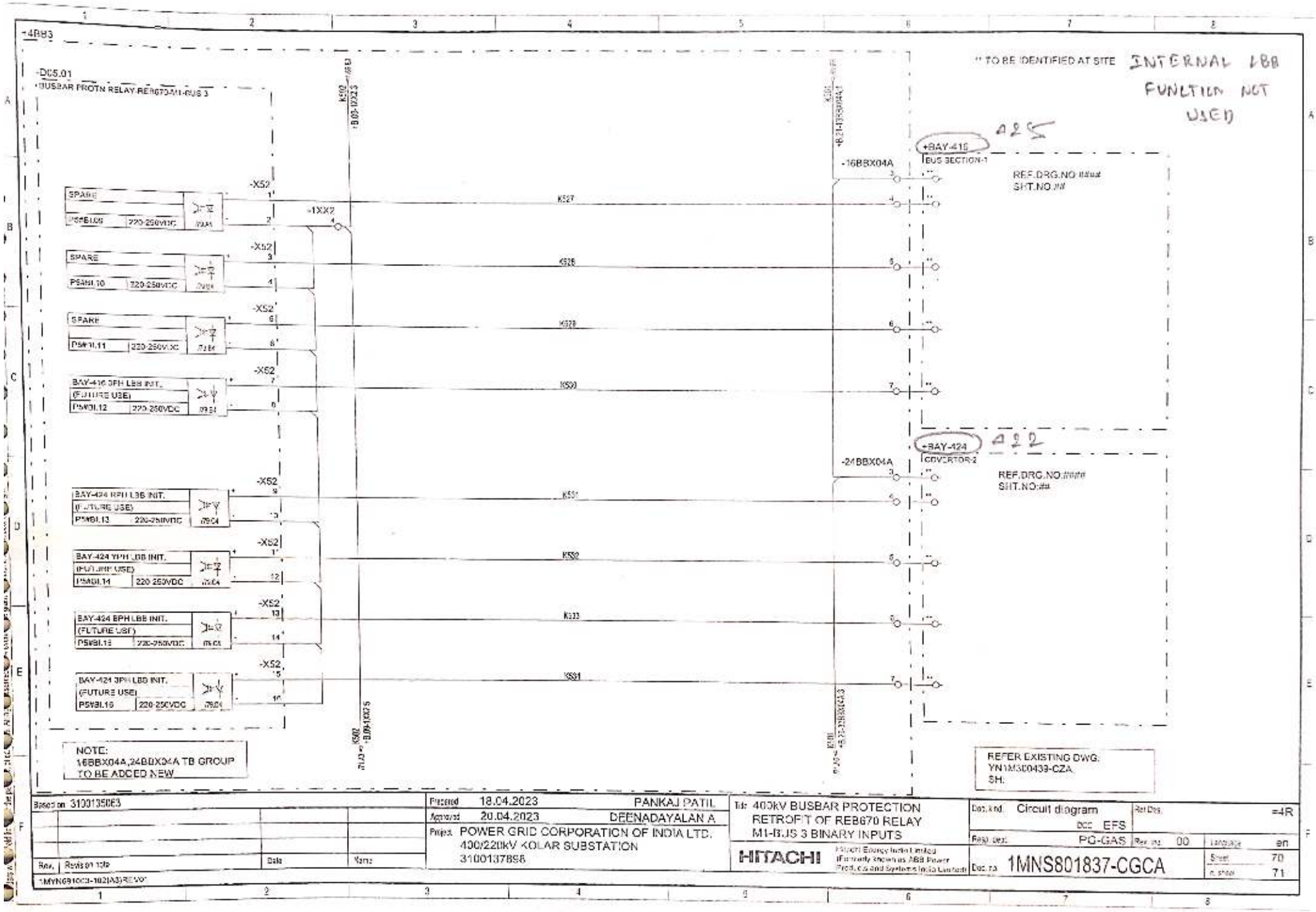
Based on 3100125033	Prepared 18.04.2023 PANKAJ PATIL	Title 400KV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS	Doc kind. Circuit diagram DOC EFS	Ref Des.	-4R
	Approved 20.04.2023 DEENADAYALAN A				
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00	Language en
			Doc. no. 1MNS801837-CGCA		Sheet 68
Rev Revision note / Date / Name					n. sheet 69

1MYN881003-102(A3)REV01

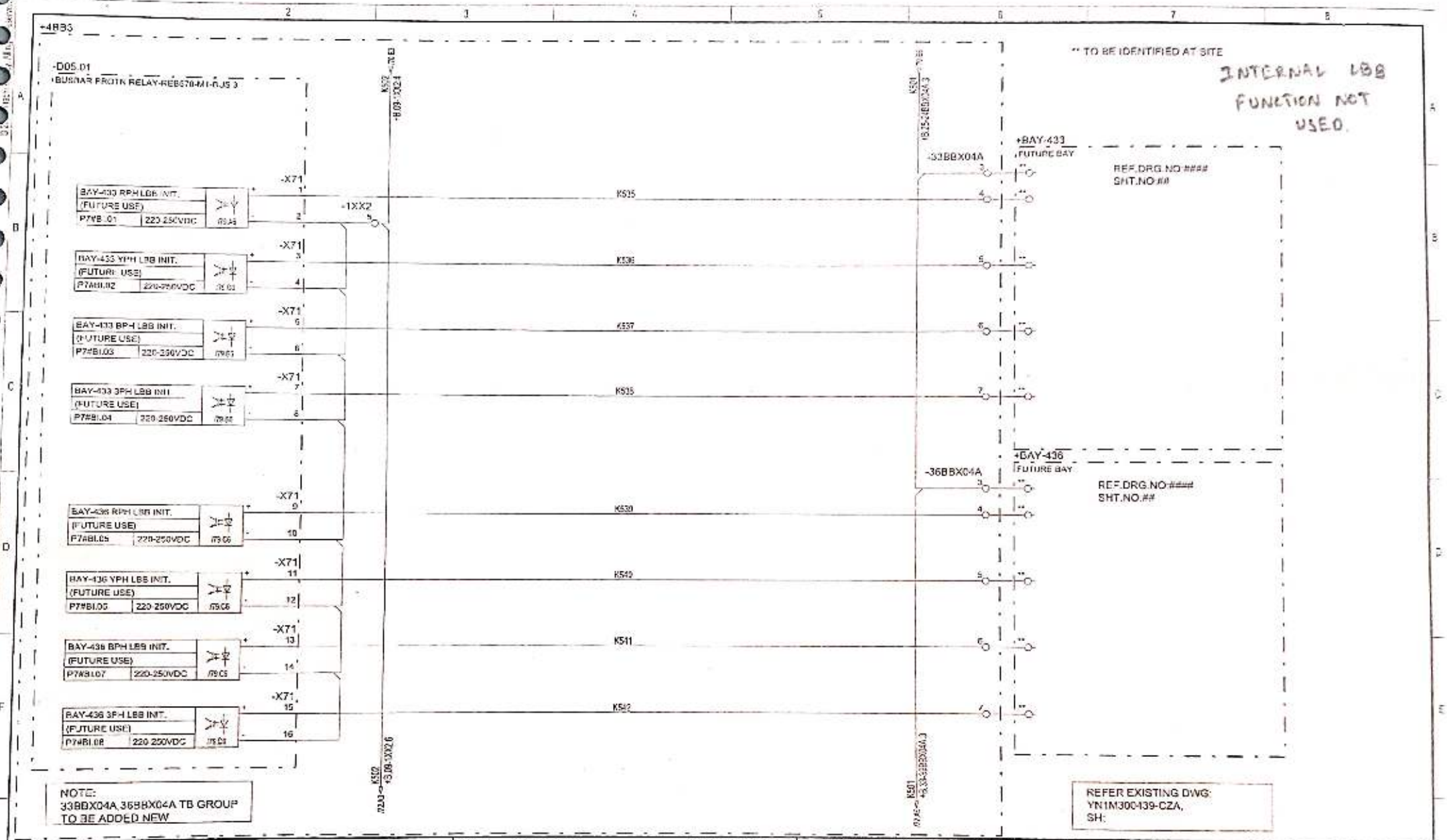
Scanned with OKEN Scanner



Scanned with OKEN Scanner

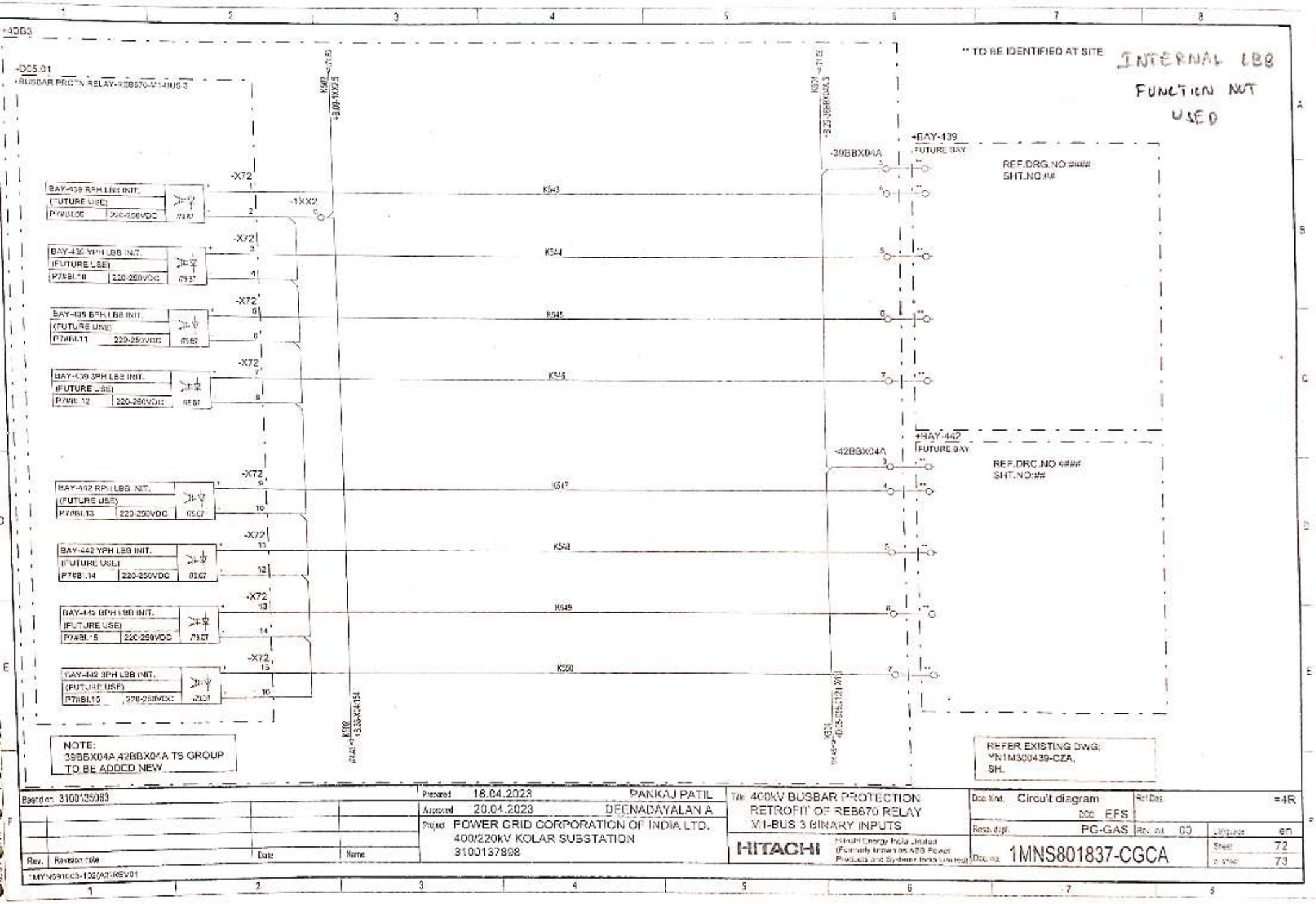


Scanned with OKEN Scanner



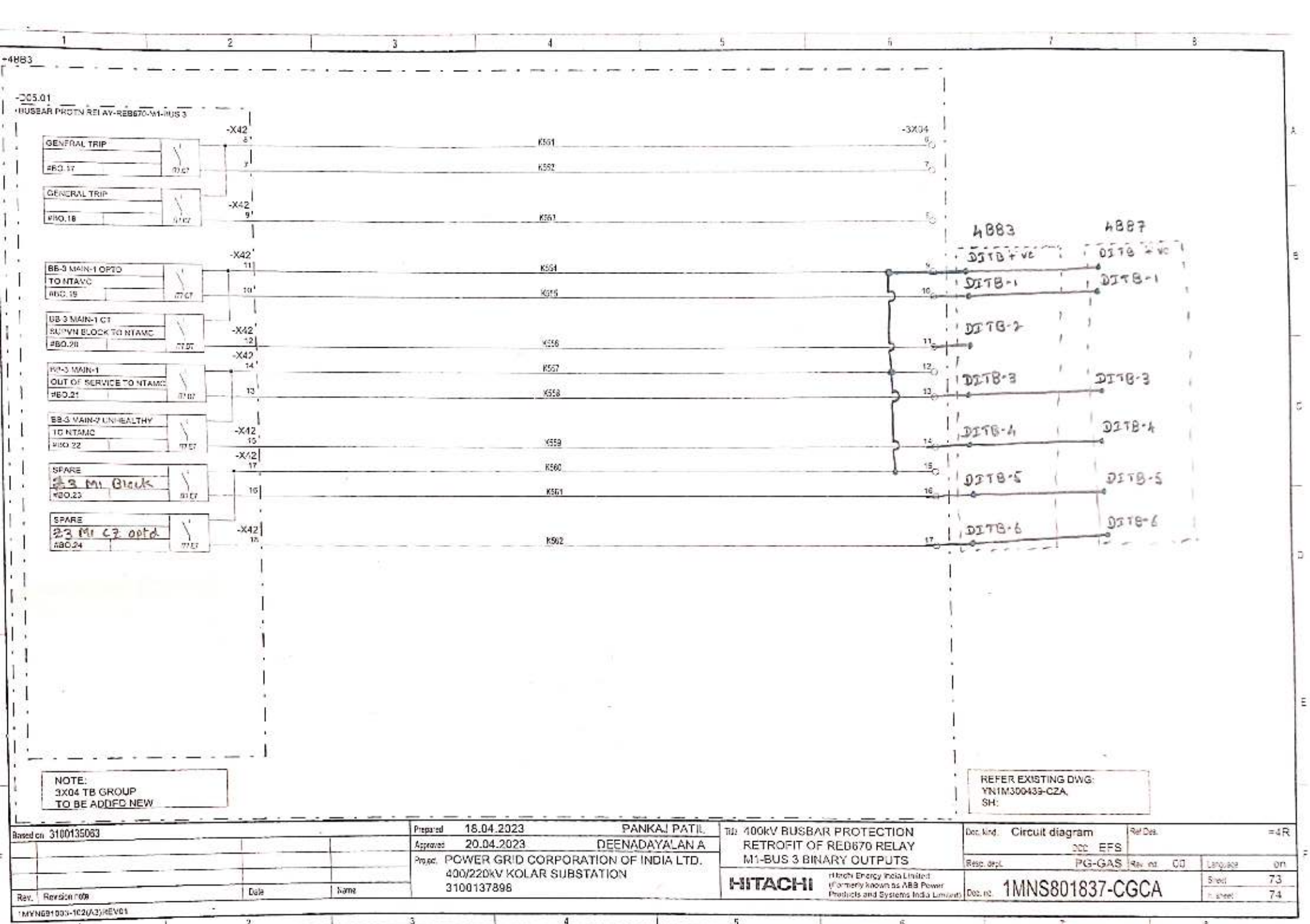
Based on 3100135063			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS	Doc. kind Circuit diagram	Ref.Des.	=4R
			Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev.	Revision note	Date	Name	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 71
1MYN691003-102(A2)REV01							n. sheet 72

Scanned with OKEN Scanner



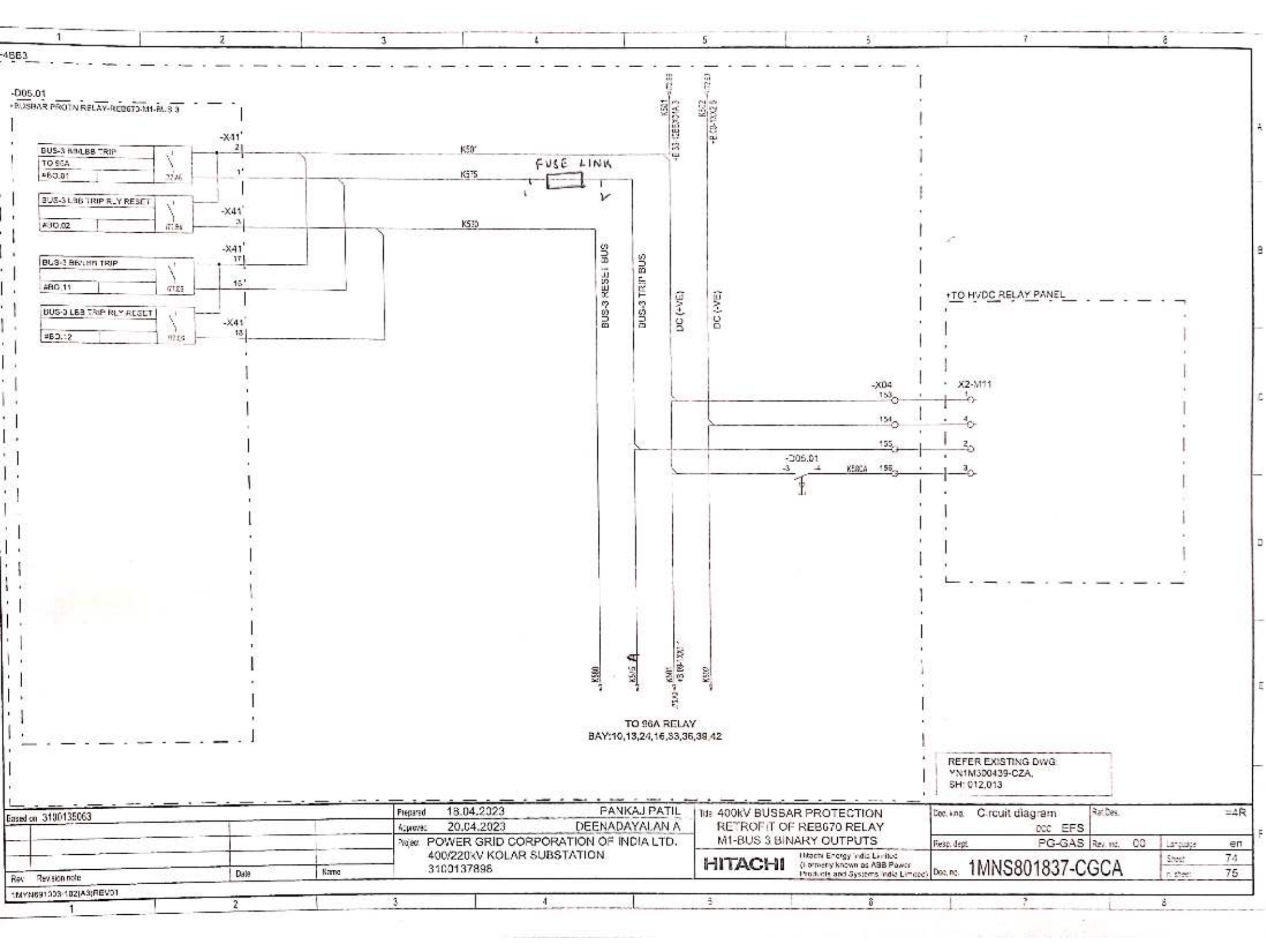
Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS	Doc kind. Circuit diagram DOC EFS	Ref Doc.	=4R
	Approved 20.04.2023 DECNADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 72	of sheets 73
Rev. Revision note Date Name					
*MYN0910C3-132/A2/REV01					

Scanned with OKEN Scanner



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY OUTPUTS	Doc. kind Circuit diagram	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		acc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision 009 Date Name			Doc. no. 1MNS801837-CGCA	Sheet 73	
1MYN891000-102(A3)REV01				n. sheet 74	

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

K501 ◁/74.E5
+D.05-D05.01:-3

BAY-410 RPH LBB RETRIP-M1	#BO.03	/77.B6	-X41 5	-1XX1 1	4
BAY-410 YPH LBB RETRIP-M1	#BO.04	/77.C6	-X41 6		
BAY-410 BPH LBB RETRIP-M1	#BO.05	/77.C6	-X41 8		7
BAY-413 RPH LBB RETRIP-M1	#BO.06	/77.C6	-X41 9		
BAY-413 YPH LBB RETRIP-M1	#BO.07	/77.C6	-X41 11	-1XX1 2	10
BAY-413 BPH LBB RETRIP-M1	#BO.08	/77.D6	-X41 12		
BAY-424 RPH LBB RETRIP-M1	#BO.09	/77.D6	-X41 14		13
BAY-424 YPH LBB RETRIP-M1	#BO.10	/77.E6	-X41 15		
BAY-424 BPH LBB RETRIP-M1	#BO.01	/78.A2	-X61 2	-1XX1 3	1
BAY-416 LBB RETRIP-M1	#BO.02	/78.B2	-X61 3		
BAY-433 RPH LBB RETRIP-M1	#BO.03	/78.B2	-X61 5		4
BAY-433 YPH LBB RETRIP-M1	#BO.04	/78.B2	-X61 6		

-3X04: 3P13 18, 3P15 19, 3P17 20, 3P19 21, 3P21 22, 3P23 23, 3P25 24, 3P27 25, 3P29 26, 3P31 27, 3P33 28, 3P35 29

NOTE:
1XX1, 3X04 TB GROUP
TO BE ADDED NEW

K501 ◁/75.A6
+B.09-1XX1:4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

K501 ◁/75.E3
+B.09-1XX1:3

BAY-433 BPH LBB RETRIP-M1	#BO.05	/78.C2	-X61 8	-1XX1 4	7
BAY-436 RPH LBB RETRIP-M1	#BO.06	/78.C2	-X61 9		
BAY-436 YPH LBB RETRIP-M1	#BO.07	/78.C2	-X61 11		10
BAY-436 BPH LBB RETRIP-M1	#BO.08	/78.D2	-X61 12		
BAY-439 RPH LBB RETRIP-M1	#BO.09	/78.D2	-X61 14	-1XX1 5	13
BAY-439 YPH LBB RETRIP-M1	#BO.10	/78.D2	-X61 15		
BAY-439 BPH LBB RETRIP-M1	#BO.11	/78.E2	-X61 17		16
BAY-442 RPH LBB RETRIP-M1	#BO.12	/78.E2	-X61 18		
BAY-442 YPH LBB RETRIP-M1	#BO.13	/78.A4	-X62 2	-1XX1 6	1
BAY-442 BPH LBB RETRIP-M1	#BO.14	/78.B4	-X62 3		

-3X04: 3P37 30, 3P39 31, 3P41 32, 3P43 33, 3P45 34, 3P47 35, 3P49 36, 3P51 37, 3P53 38, 3P55 39

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title: 400kV BUSBAR PROTECTION
M1-BUS 3 BINARY OUTPUTS
M1-BUS 3 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	75
		n. sheet	76

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB3

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
PSM
90-250VDC

-X11

4 +
5 -
/66.B3
90-250VDC

PE

-X11

BUSBAR RELAY FAULTY	2	
BUS-3 MAIN-1	3	/139.E7
	1	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
TRM
1A, 50/60Hz

-X401

BAY_410_R PHASE	+	1		
HOODY LINE-2				
P40#AI.01 CT: 1A	-	2		/62.A2
BAY_410_Y PHASE	+	3		
HOODY LINE-2				
P40#AI.02 CT: 1A	-	4		/62.B2
BAY_410_B PHASE	+	5		
HOODY LINE-2				
P40#AI.03 CT: 1A	-	6		/62.B2
BAY_413_R PHASE	+	7		
CUDDAPAH LINE				
P40#AI.04 CT: 1A	-	8		/62.D2
BAY_413_Y PHASE	+	9		
CUDDAPAH LINE				
P40#AI.05 CT: 1A	-	10		/62.D2
BAY_413_B PHASE	+	11		
CUDDAPAH LINE				
P40#AI.06 CT: 1A	-	12		/62.E2
BAY_416_R PHASE	+	13		
BUS SECTION				
P40#AI.07 CT: 1A	-	14		/63.A2
BAY_416_Y PHASE	+	15		
BUS SECTION				
P40#AI.08 CT: 1A	-	16		/63.B2
BAY_416_B PHASE	+	17		
BUS SECTION				
P40#AI.09 CT: 1A	-	18		/63.B2
BAY_424_R PHASE	+	19		
CONVERTER-2				
P40#AI.10 CT: 1A	-	20		/63.D2
BAY_424_Y PHASE	+	21		
CONVERTER-2				
P40#AI.11 CT: 1A	-	22		/63.D2
BAY_424_B PHASE	+	23		
CONVERTER-2				
P40#AI.12 CT: 1A	-	24		/63.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
TRM
1A, 50/60Hz

-X401

BAY_433_R PHASE	+	1		
FUTURE BAY				
P40#AI.01 CT: 1A	-	2		/64.A2
BAY_433_Y PHASE	+	3		
FUTURE BAY				
P40#AI.02 CT: 1A	-	4		/64.B2
BAY_433_B PHASE	+	5		
FUTURE BAY				
P40#AI.03 CT: 1A	-	6		/64.B2
BAY_436_R PHASE	+	7		
FUTURE BAY				
P40#AI.04 CT: 1A	-	8		/64.D2
BAY_436_Y PHASE	+	9		
FUTURE BAY				
P40#AI.05 CT: 1A	-	10		/64.D2
BAY_436_B PHASE	+	11		
FUTURE BAY				
P40#AI.06 CT: 1A	-	12		/64.E2
BAY_439_R PHASE	+	13		
FUTURE BAY				
P40#AI.07 CT: 1A	-	14		/65.A2
BAY_439_Y PHASE	+	15		
FUTURE BAY				
P40#AI.08 CT: 1A	-	16		/65.B2
BAY_439_B PHASE	+	17		
FUTURE BAY				
P40#AI.09 CT: 1A	-	18		/65.B2
BAY_442_R PHASE	+	19		
FUTURE BAY				
P40#AI.10 CT: 1A	-	20		/65.D2
BAY_442_Y PHASE	+	21		
FUTURE BAY				
P40#AI.11 CT: 1A	-	22		/65.D2
BAY_442_B PHASE	+	23		
FUTURE BAY				
P40#AI.12 CT: 1A	-	24		/65.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 76
n. sheet 77

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

Scanned with OKEN Scanner

+4BG3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X31

MAIN 1 BUS 3 PROT IN	P3#BI.01	220-250VDC
MAIN 1 BUS 3 PROT OUT	P3#BI.02	220-250VDC
SPARE	P3#BI.03	220-250VDC
TRIP RELAY RESET 86A BUS-3	P3#BI.04	220-250VDC
SPARE	P3#BI.05	220-250VDC
SPARE	P3#BI.06	220-250VDC
SPARE	P3#BI.07	220-250VDC
REB670 RELAY FAULTY BUS 3 - MAIN 2	P3#BI.08	220-250VDC

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X32

BAY410-EXT.LBB OPERATED	P3#BI.09	220-250VDC
BAY413-EXT.LBB OPERATED	P3#BI.10	220-250VDC
BAY418-EXT.LBB OPERATED	P3#BI.11	220-250VDC
BAY424 EXT.LBB OPERATED	P3#BI.12	220-250VDC
BAY433-EXT.LBB OPERATED	P3#BI.13	220-250VDC
BAY436-EXT.LBB OPERATED	P3#BI.14	220-250VDC
BAY439-EXT.LBB OPERATED	P3#BI.15	220-250VDC
BAY442-EXT.LBB OPERATED	P3#BI.16	220-250VDC

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X41

BUS-3 BBLBB TRIP TO 86A	#BO.01
BUS-3 LBB TRIP RLY RESET	#BO.02
BAY-410 RPH LBB RETRIP-M1	#BO.03
BAY-410 YPH LBB RETRIP-M1	#BO.04
BAY-410 BPH LBB RETRIP-M1	#BO.05
BAY-413 RPH LBB RETRIP-M1	#BO.06
BAY-413 YPH LBB RETRIP-M1	#BO.07
BAY-413 BPH LBB RETRIP-M1	#BO.08
BAY-424 RPH LBB RETRIP-M1	#BO.09
BAY-424 YPH LBB RETRIP-M1	#BO.10
BUS-3 DBLBB TRIP	#BO.11
BUS-3 LBB TRIP RLY RESET	#BO.12

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X42

BUSBAR-3 OPTD ANNUNCIATION CKT	#BO.13
BB-3 CT SUPVN ANNUNCIATION CKT	#BO.14
BUSBAR-3 OPTD EVENT LOGGER CKT	#BO.15
BB-3 CT SUPVN EVENT LOGGER CKT	#BO.16
GENERAL TRIP	#BO.17
GENERAL TRIP	#BO.18
BB-3 MAIN-1 OPTD TO NTAMC	#BO.19
BB-3 MAIN-1 CT SUPVN BLOCK TO NTAMC	#BO.20
BB-3 MAIN-1 OUT OF SERVICE TO NTAMC	#BO.21
BB-3 MAIN-2 UNHEALTHY TO NTAMC	#BO.22
SPARE Z3 M1 Block	#BO.23
SPARE Z3 M1 C2 optd.	#BO.24

Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW	Doc. kind Circuit diagram; Ref Des. =4R
	Approved 20.04.2023 DEENADAYALAN A		DCC EFS
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS; Rev. ind. 00; Language en
Rev. Revision note / Date / Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA; Sheet 77; n. Sheet 78

1MYNS991003-102(AS)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X61

BAY-424 BPH LBB RETRIP-M1	#BO.01	2 / 1	/75.D2
BAY-416 LBB RETRIP-M1	#BO.02	3	/75.E2
BAY-433 RPH LBB RETRIP-M1	#BO.03	5 / 4	/75.E2
BAY-433 YPH LBB RETRIP-M1	#BO.04	6	/75.E2
BAY-433 BPH LBB RETRIP-M1	#BO.05	8 / 7	/75.B5
BAY-436 RPH LBB RETRIP-M1	#BO.06	9	/75.B5
BAY-436 YPH LBB RETRIP-M1	#BO.07	11 / 10	/75.B5
BAY-436 BPH LBB RETRIP-M1	#BO.08	12	/75.C5
BAY-439 RPH LBB RETRIP-M1	#BO.09	14 / 13	/75.C5
BAY-439 YPH LBB RETRIP-M1	#BO.10	15	/75.C5
BAY-439 BPH LBB RETRIP-M1	#BO.11	17 / 16	/75.D5
BAY-442 RPH LBB RETRIP-M1	#BO.12	18	/75.D5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X62

BAY-442 YPH LBB RETRIP-M1	#BO.13	2 / 1	/75.D5
BAY-442 BPH LBB RETRIP-M1	#BO.14	3	/75.E5
BUSBAR-3 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/174.E2
BB-3 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/174.E2
SPARE	#BO.17	8 / 7	
SPARE	#BO.18	9	
SPARE	#BO.19	11 / 10	
SPARE	#BO.20	12	
SPARE	#BO.21	14 / 13	
SPARE	#BO.22	15	
SPARE	#BO.23	17 / 16	
SPARE	#BO.24	18	

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 78
n. sheet 79

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB3

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X51

BAY-410 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	/69.B2
BAY-410 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	/69.B2
BAY-410 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	/69.C2
BAY-410 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	/69.C2
BAY-413 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	/69.D2
BAY-413 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	/69.D2
BAY-413 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	/69.E2
BAY-413 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	/69.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X52

SPARE		P5#BI.09	220-250VDC	/70.B2
SPARE		P5#BI.10	220-250VDC	/70.B2
SPARE		P5#BI.11	220-250VDC	/70.C2
BAY-416 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	/70.C2
BAY-424 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	/70.D2
BAY-424 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	/70.D2
BAY-424 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	/70.E2
BAY-424 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	/70.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X71

BAY-433 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	/71.B2
BAY-433 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	/71.B2
BAY-433 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	/71.C2
BAY-433 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	/71.C2
BAY-436 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	/71.D2
BAY-436 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	/71.D2
BAY-436 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	/71.E2
BAY-436 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	/71.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X72

BAY-439 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	/72.B2
BAY-439 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	/72.B2
BAY-439 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	/72.C2
BAY-439 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	/72.C2
BAY-442 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	/72.D2
BAY-442 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	/72.D2
BAY-442 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	/72.E2
BAY-442 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	/72.E2

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

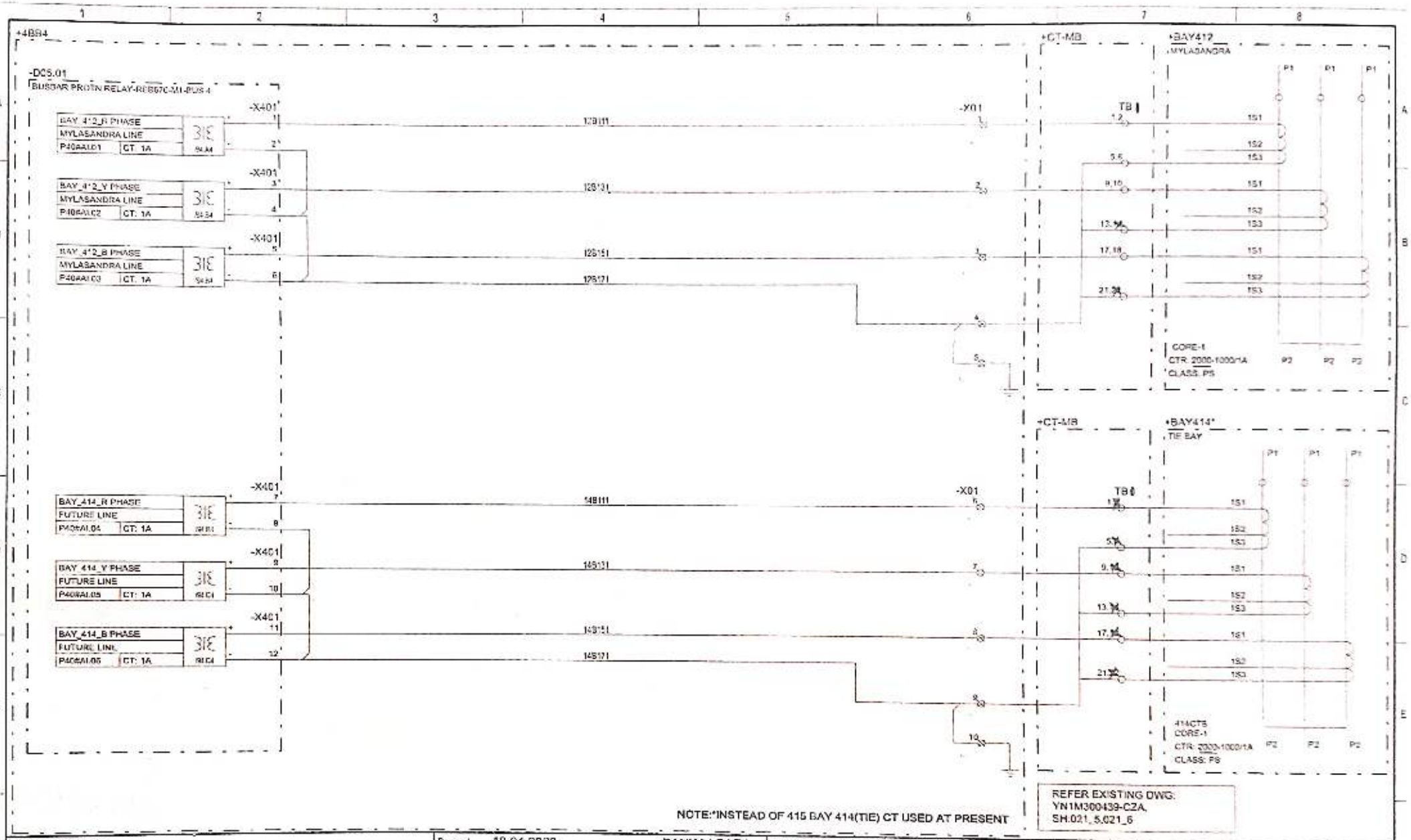
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 79
n. sheet 80

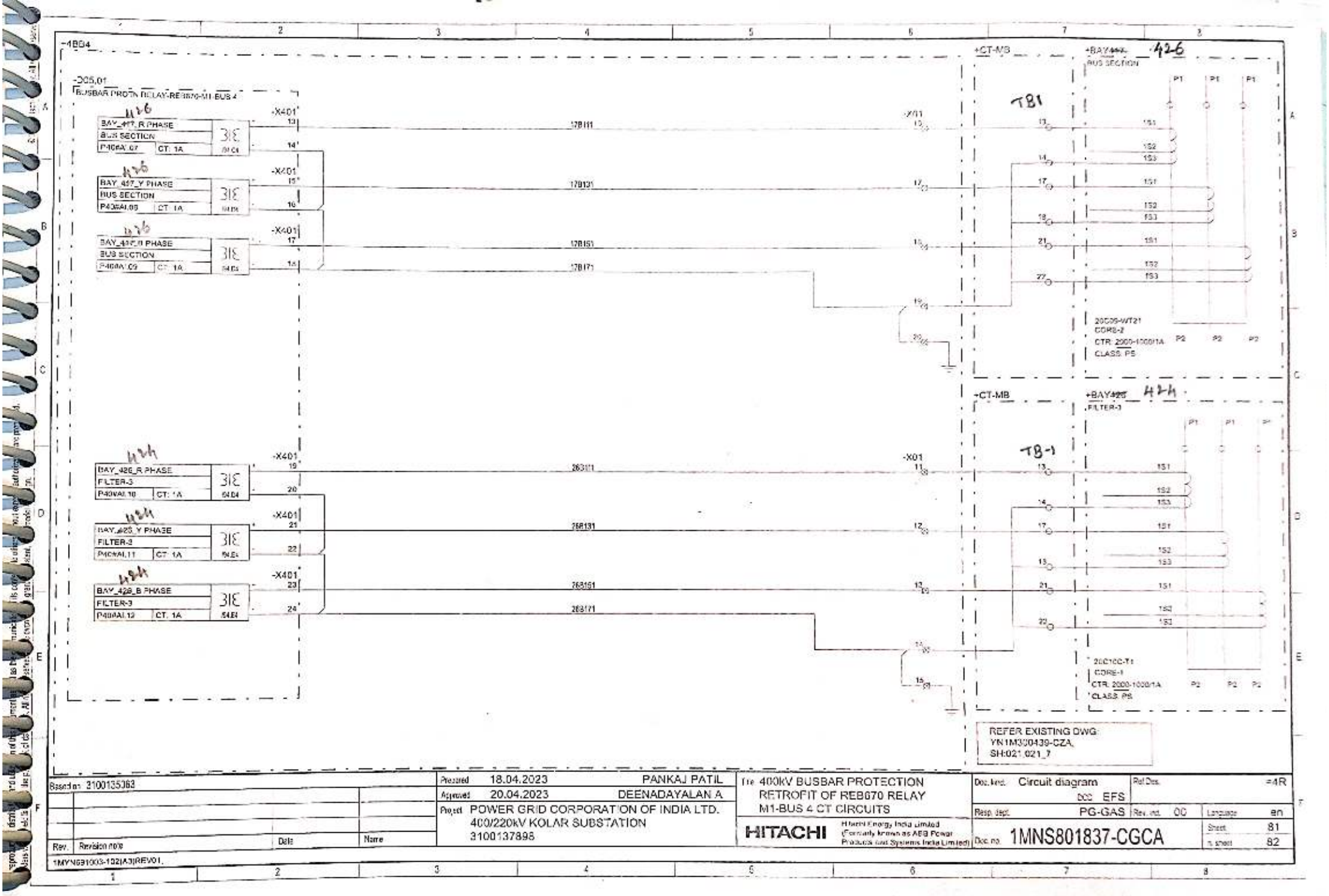
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

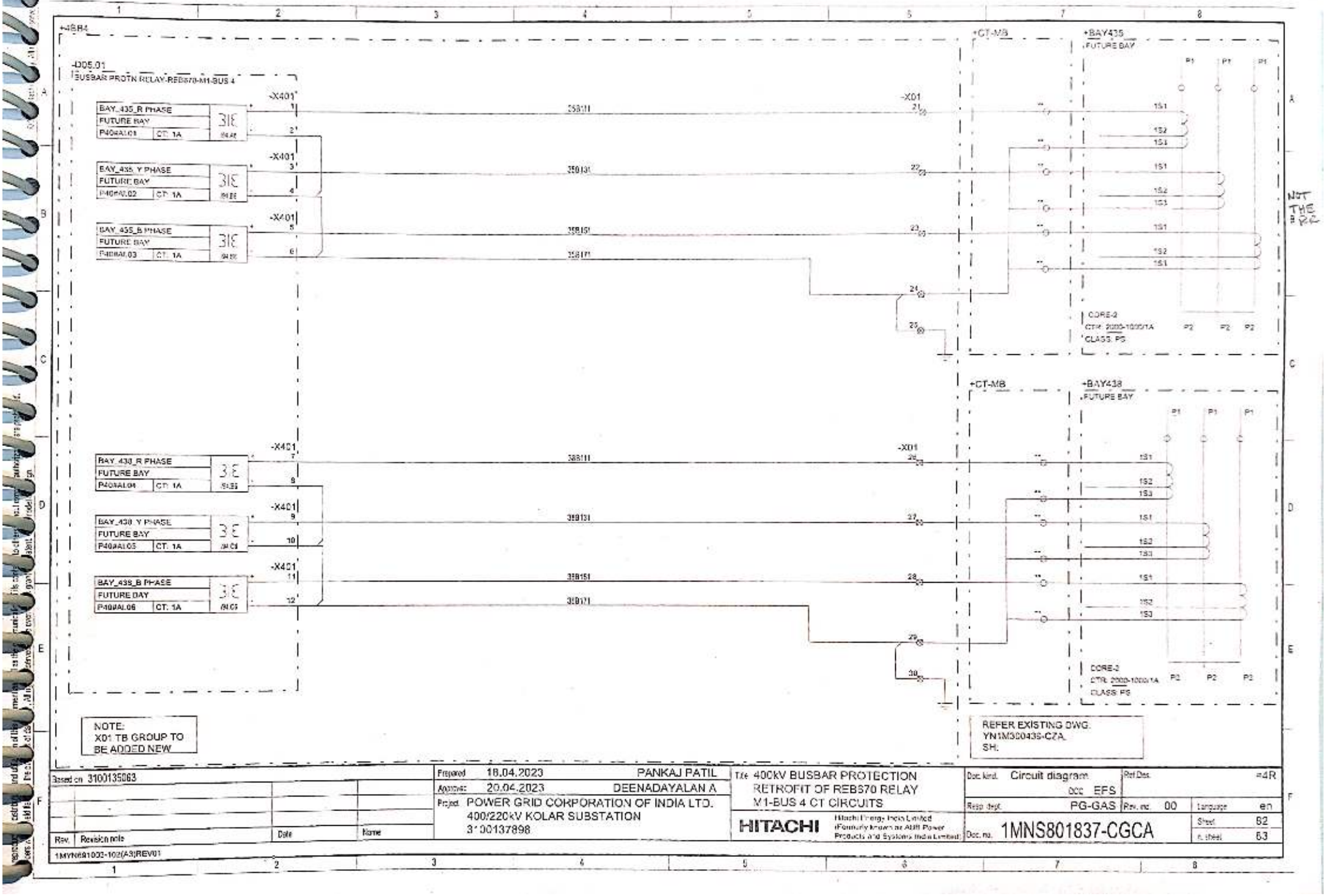


Based on 3100135003			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 CT CIRCUITS	Doc. kind Circuit diagram	Ref.Des.	=4R
			Approved 20.04.2023 DEENADAYALAN A		DCC EFS		
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev.	Revision note	Date	Name		Doc. no. 1MNS801837-CGCA	Sheet 80	
1MYN691013-102(A3)REV01						n. sheet 81	

Scanned with OKEN Scanner



Scanned with OKEN Scanner



NOT THE P&C

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

BAY_441_R PHASE			-X401 + 13 / - 14
FUTURE BAY			
P40#AI.07	CT: 1A	/94.C6	
BAY_441_Y PHASE			-X401 + 15 / - 16
FUTURE BAY			
P40#AI.08	CT: 1A	/94.D6	
BAY_441_B PHASE			-X401 + 17 / - 18
FUTURE BAY			
P40#AI.09	CT: 1A	/94.D6	

BAY_444_R PHASE			-X401 + 19 / - 20
FUTURE BAY			
P40#AI.10	CT: 1A	/94.D6	
BAY_444_Y PHASE			-X401 + 21 / - 22
FUTURE BAY			
P40#AI.11	CT: 1A	/94.E6	
BAY_444_B PHASE			-X401 + 23 / - 24
FUTURE BAY			
P40#AI.12	CT: 1A	/94.E6	

-D21.125.101

41B112	3A	/84.D8	3B
41B111	7A	/84.D8	7B
41B132	4A	/84.D8	4B
41B131	8A	/84.D8	8B
41B152	5A	/84.D8	5B
41B151	9A	/84.E8	9B
41B172	6A	/84.D8	6B
41B171	10A	/84.E8	10B

** -X01

31	**
32	**
33	**
34	
35	
36	**
37	**
38	**
39	
40	

+CT-MB

+BAY441
FUTURE BAY

**	1S1	P1 P1 P1
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	

CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

+CT-MB

+BAY444
FUTURE BAY

**	1S1	P1 P1 P1
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	

CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 83
n. sheet 84

1MYN691003-102(A3)REV01

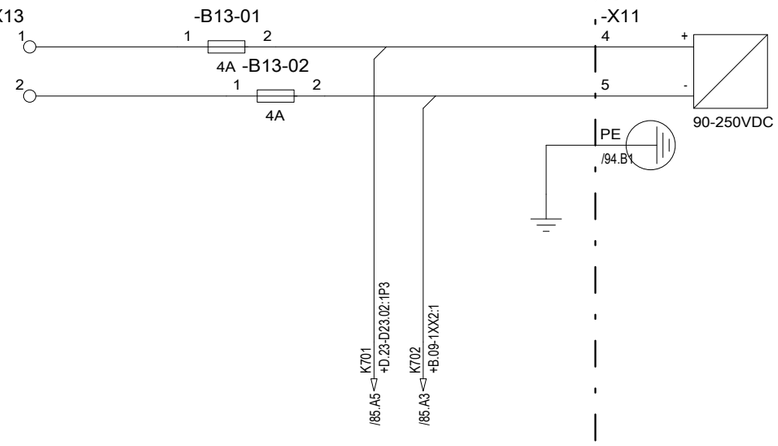
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

FROM SH: 006/2

-X13 -B13-01 -B13-02



-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
SFP

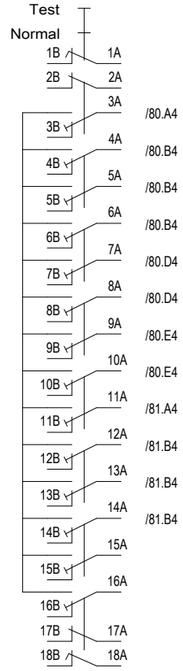
-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

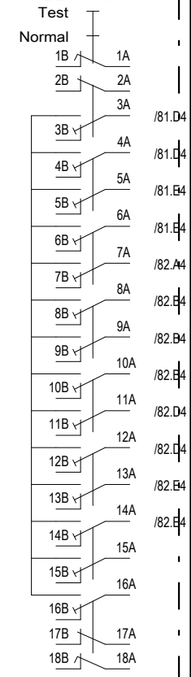
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

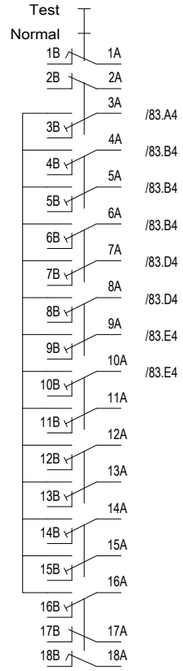
-D21.101.101



-D21.113.101



-D21.125.101



REFER EXISTING DWG:
YN1M300439-CZA,
SH: 023

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL

Approved 20.04.2023 DEENADAYALAN A

Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS

Ref.Des. =4R

Resp. dept. PG-GAS

Rev. ind. 01

Language en

Doc. no. 1MNS801837-CGCA

Sheet 84

n. sheet 85

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

-X31	1	+	MAIN 1 BUS 4 PROT IN	
	2	-	P3#BI.01	220-250VDC /95.A2
-X31	3	+	MAIN 1 BUS 4 PROT OUT	
	4	-	P3#BI.02	220-250VDC /95.B2
-X31	5	+	SPARE	
	6	-	P3#BI.03	220-250VDC /95.B2
-X31	7	+	TRIP RELAY OPTD 96A BUS-4	
	8	-	P3#BI.04	220-250VDC /95.B2
-X31	9	+	SPARE	
	10	-	P3#BI.05	220-250VDC /95.C2
-X31	11	+	SPARE	
	12	-	P3#BI.06	220-250VDC /95.C2
-X31	13	+	SPARE	
	14	-	P3#BI.07	220-250VDC /95.C2
-X31	15	+	REB670 RELAY FAULTY BUS 4 - MAIN 2	
	16	-	P3#BI.08	220-250VDC /95.D2

-1XX2 1

+D.05-D05.01:5 (-X11) /84.B2 K702

+D.05-D05.01:4 (-X11) /84.B2 K701

K703 -D23.02 1P3 1P4 /85.B8 IN
BB-4 M1 IN/OUT SWITCH

K704 -D23.02 1P2 /85.A8 OUT 1P1
BB-4 M1 IN/OUT SWITCH

K705 -4X04 1

K706 K701 /170.E8 +D.17-D17.101.149:222
K706 /170.D5 +D.13-D13.101.101:221

-4X04 2

K707 3

K708 4

K709 5

K710 -X14A 1 -X14A 2

-D23.02
1P2 /85.B4 C 1P1
1P4 /85.B3 A 1P3
2P2 C 2P1
2P4 A 2P3
3P2 C 3P1
3P4 A 3P3
4P2 C 4P1
4P4 A 4P3
IN A
OUT C
BB-4 M1 IN/OUT SWITCH

+4BB8
+D.05
-X14A 1 2
-X11 2 3 1
/166.B2
BUSBAR RELAY FAULTY
BUS-4 MAIN-2

NOTE:
7X04 TB GROUP
TO BE ADDED NEW

+B.09-1XX2:2 /86.A3 K702

+B.33-X04:13 /86.A5 K701

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

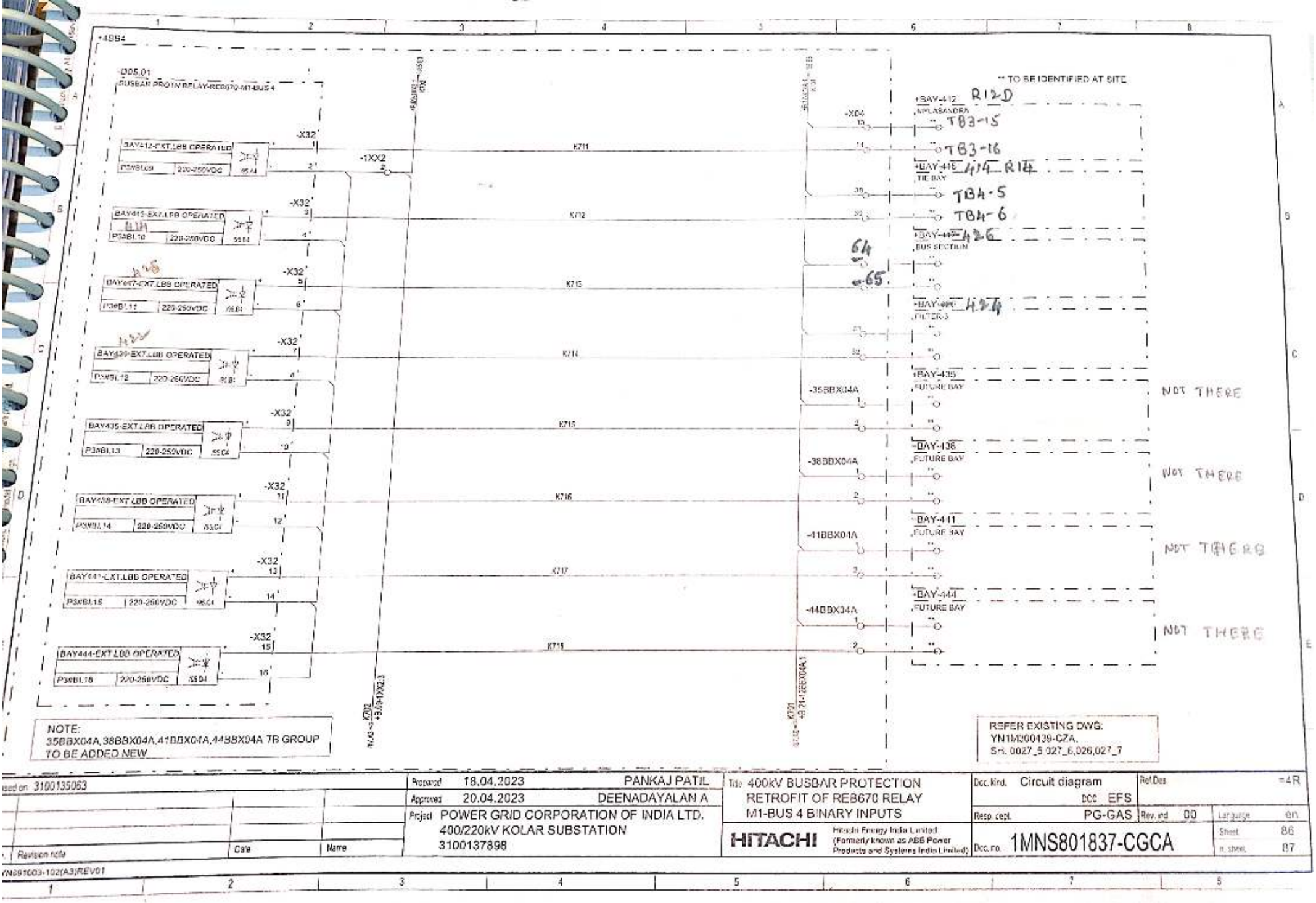
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 85
n. sheet 86

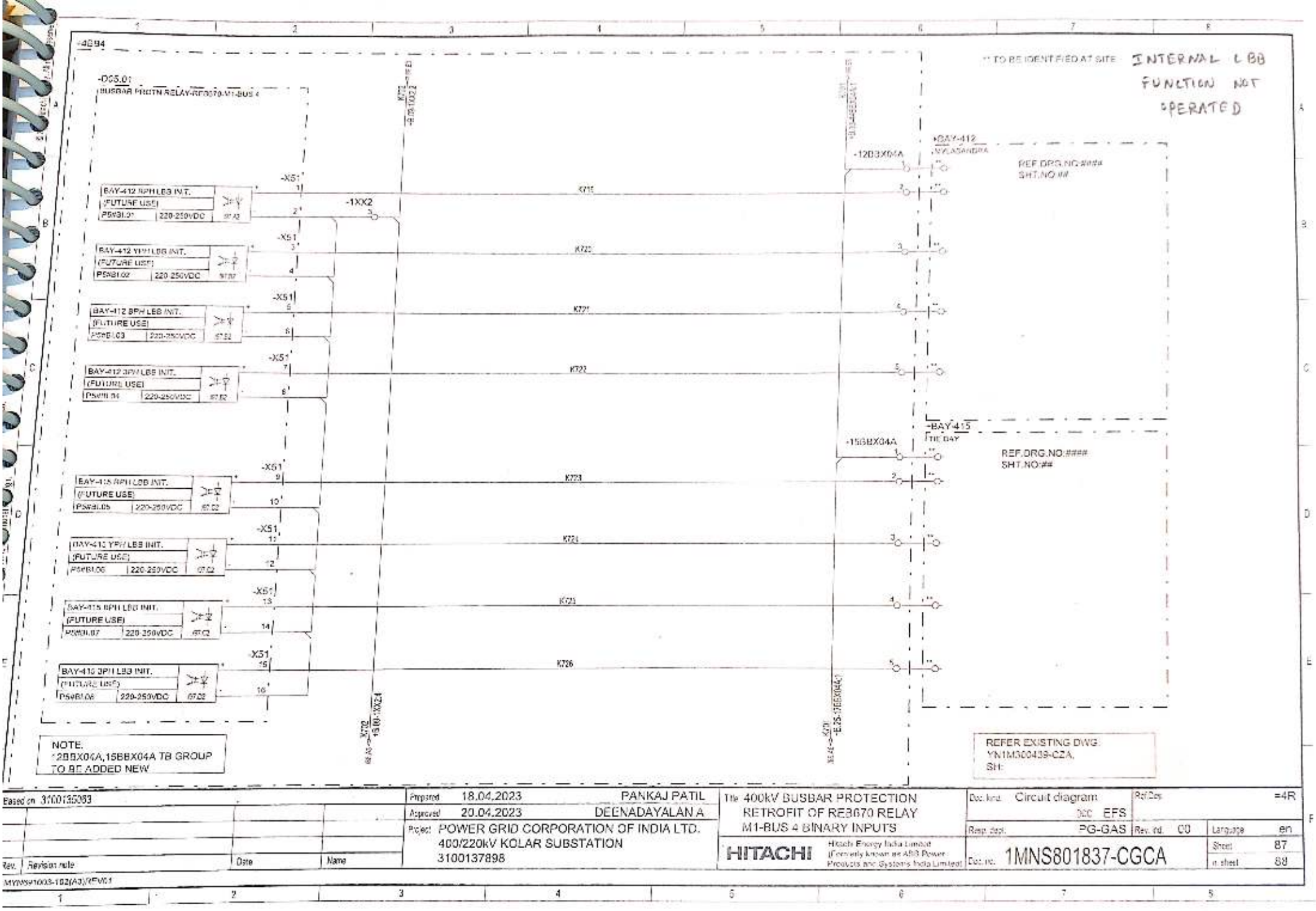
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

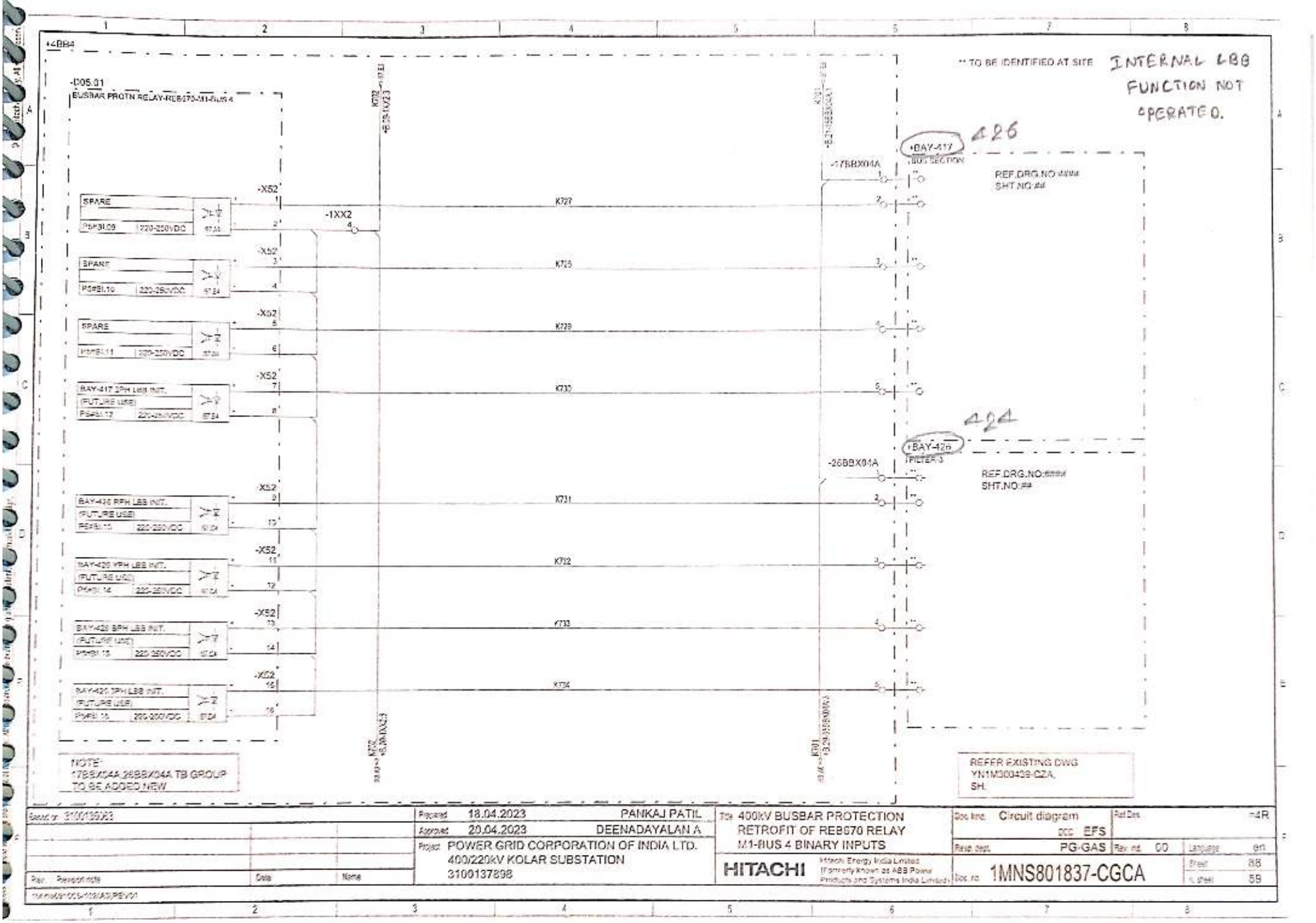


Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY INPUTS	Doc.kind. Circuit diagram DCC EFS	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A				
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp.dept. PG-GAS	Rev.ind. 00	Language en
Revision note / Date / Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc.no. 1MNS801837-CGCA	Sheet 86	n.sheet 87

Scanned with OKEN Scanner

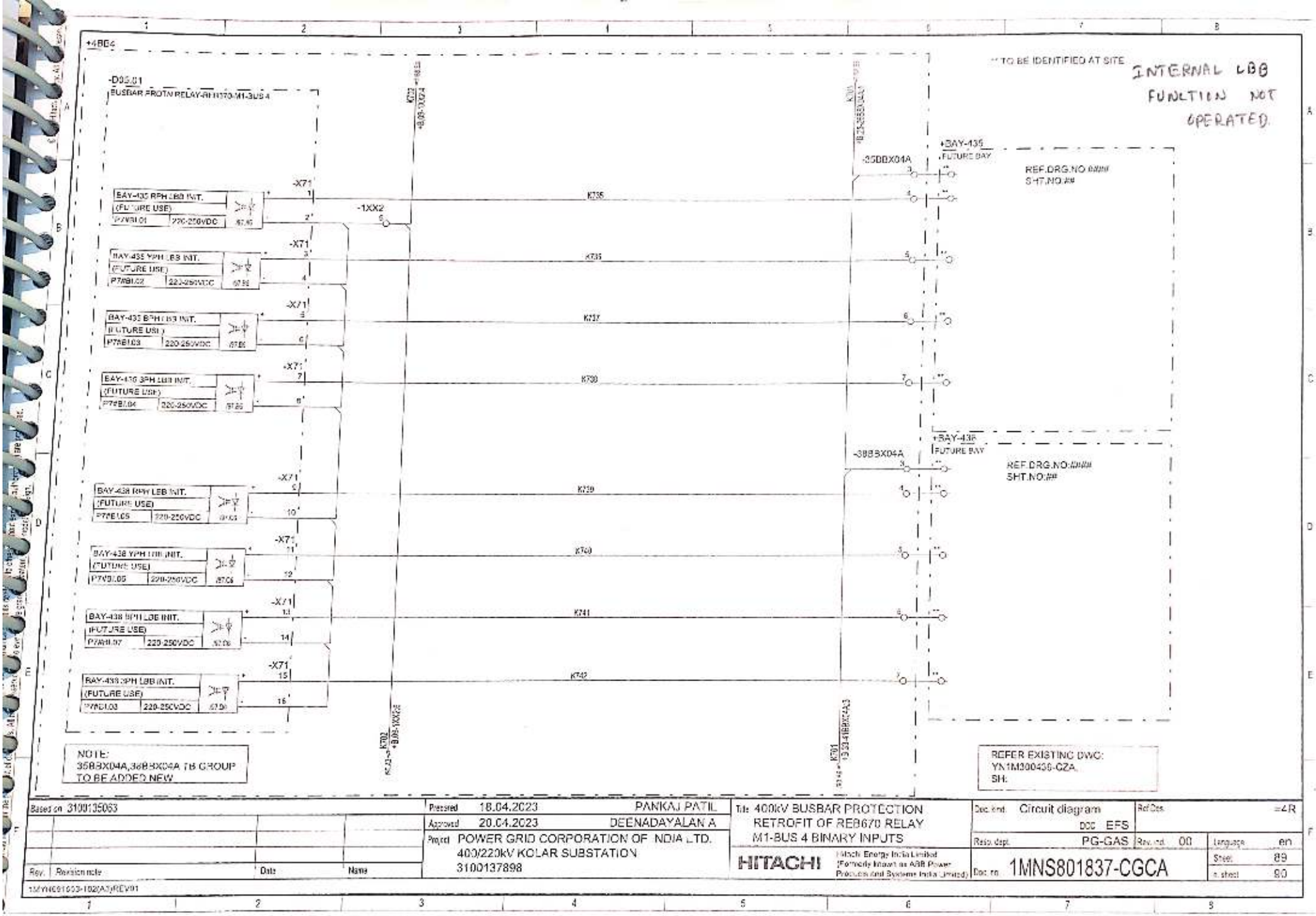


Scanned with OKEN Scanner

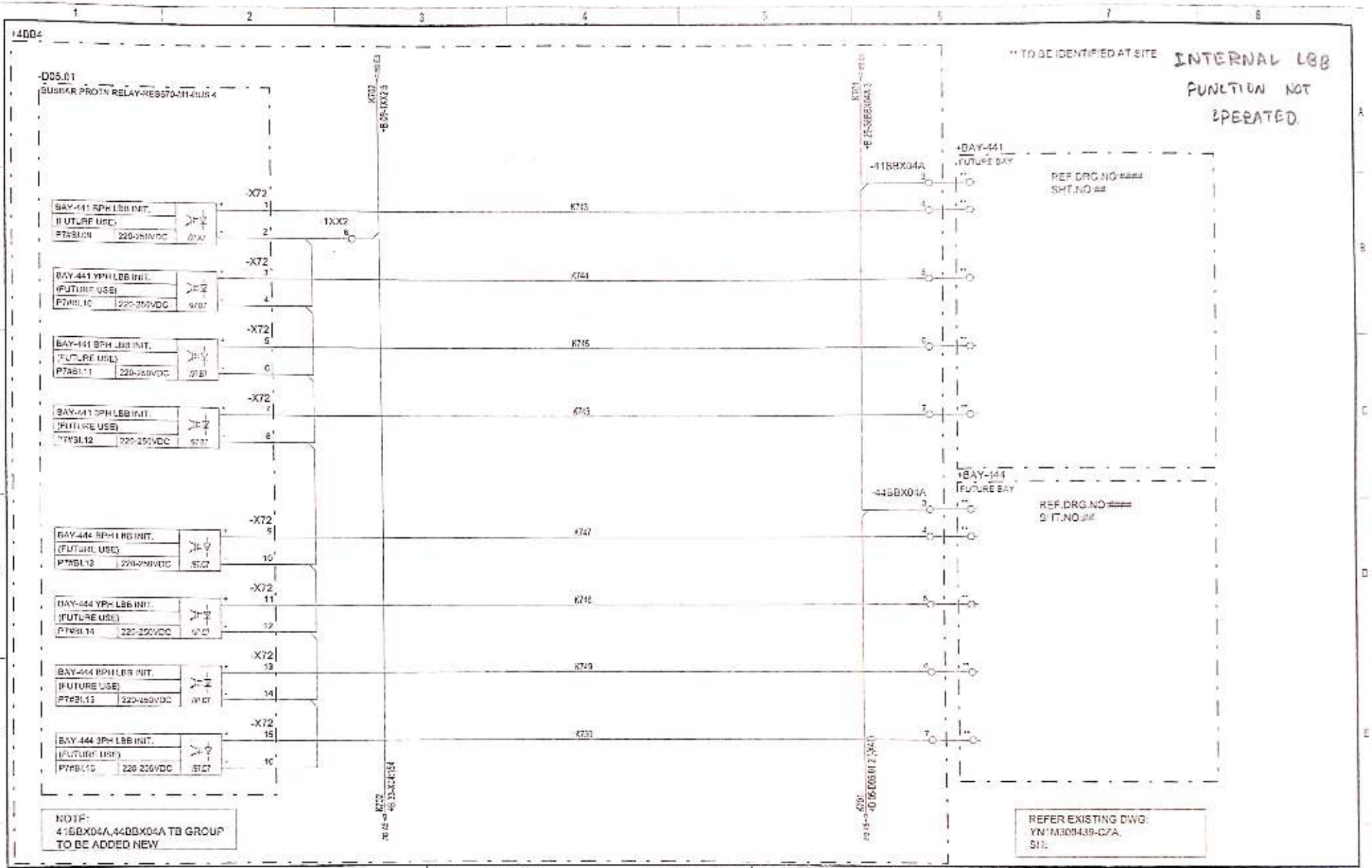


Execut. gr. 3100139023	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY INPUTS	Doc kind. Circuit diagram DCC EFS	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet	88
				No. sheet	59
Rev. Revision note	Date Name				

Scanned with OKEN Scanner

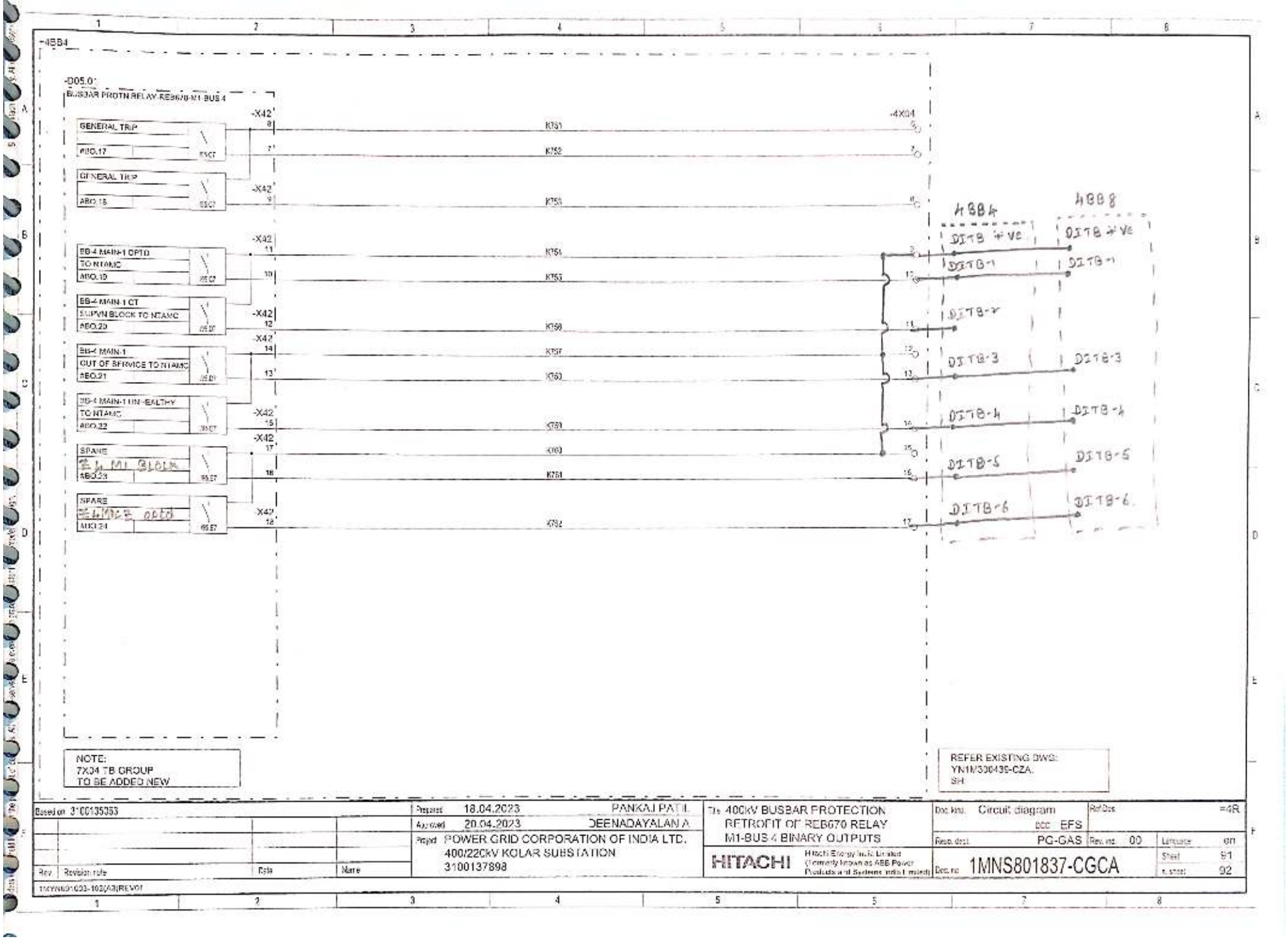


Scanned with OKEN Scanner



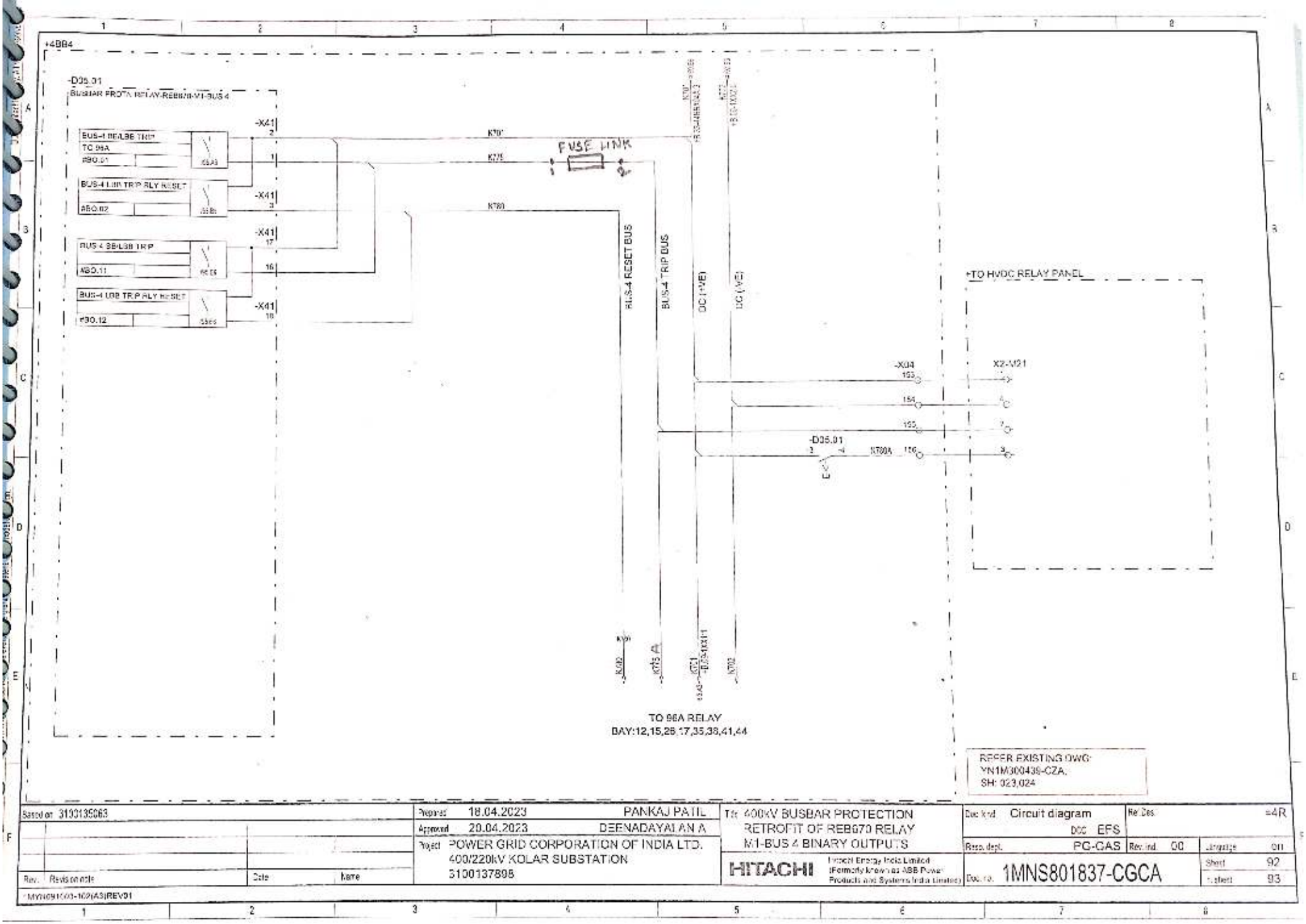
Based on 3100135093	Prepared 18.04.2023 PANKAJ PATIL	Info 400kV BUSBAR PROTECTION RETROFIT OF RED670 RELAY M1-BUS 4 BINARY INPUTS	Doc. kind Circuit diagram	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		doc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 90	
1MYNGR1003-1(A)REV01				n.sheet 91	

Scanned with OKEN Scanner



Based on 3100135053	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY OUTPUTS	Doc kind Circuit diagram; ecc EFS; Ref Des =4R
Rev. Revision note / Date / Name	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev. ind. 00; Language en
1MYN801033-102(A3)REV01	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc no 1MNS801837-CGCA; Sheet 91; n. sheet 92

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

K701 /92.E5
+D.05-D05.01:-3

BAY-412 RPH LBB RETRIP-M1	#BO.03	/95.B6	-X41 5	-1XX1 1	4P13
BAY-412 YPH LBB RETRIP-M1	#BO.04	/95.C6	-X41 6		4P15
BAY-412 BPH LBB RETRIP-M1	#BO.05	/95.C6	-X41 8		4P17
BAY-415 RPH LBB RETRIP-M1	#BO.06	/95.C6	-X41 9		4P19
BAY-415 YPH LBB RETRIP-M1	#BO.07	/95.C6	-X41 11	-1XX1 2	4P21
BAY-415 BPH LBB RETRIP-M1	#BO.08	/95.D6	-X41 12		4P23
BAY-426 RPH LBB RETRIP-M1	#BO.09	/95.D6	-X41 14		4P25
BAY-426 YPH LBB RETRIP-M1	#BO.10	/95.E6	-X41 15		4P27
BAY-426 BPH LBB RETRIP-M1	#BO.01	/96.A2	-X61 2	-1XX1 3	4P29
BAY-417 LBB RETRIP-M1	#BO.02	/96.B2	-X61 3		4P31
BAY-435 RPH LBB RETRIP-M1	#BO.03	/96.B2	-X61 5		4P33
BAY-435 YPH LBB RETRIP-M1	#BO.04	/96.B2	-X61 6		4P35

-4X04
18 4P13
19 4P15
20 4P17
21 4P19
22 4P21
23 4P23
24 4P25
25 4P27
26 4P29
27 4P31
28 4P33
29 4P35

K701 /93.A7
+B.09-1XX1:4

NOTE:
1XX1, 7X04 TB GROUP
TO BE ADDED NEW

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

K701 /93.E3
+B.09-1XX1:3

BAY-435 BPH LBB RETRIP-M1	#BO.05	/96.C2	-X61 8	-1XX1 4	4P37
BAY-438 RPH LBB RETRIP-M1	#BO.06	/96.C2	-X61 9		4P39
BAY-438 YPH LBB RETRIP-M1	#BO.07	/96.C2	-X61 11		4P41
BAY-438 BPH LBB RETRIP-M1	#BO.08	/96.D2	-X61 12		4P43
BAY-441 RPH LBB RETRIP-M1	#BO.09	/96.D2	-X61 14	-1XX1 5	4P45
BAY-441 YPH LBB RETRIP-M1	#BO.10	/96.D2	-X61 15		4P47
BAY-441 BPH LBB RETRIP-M1	#BO.11	/96.E2	-X61 17		4P49
BAY-444 RPH LBB RETRIP-M1	#BO.12	/96.E2	-X61 18		4P51
BAY-444 YPH LBB RETRIP-M1	#BO.13	/96.A4	-X62 2	-1XX1 6	4P53
BAY-444 BPH LBB RETRIP-M1	#BO.14	/96.B4	-X62 3		4P55

-4X04
30 4P37
31 4P39
32 4P41
33 4P43
34 4P45
35 4P47
36 4P49
37 4P51
38 4P53
39 4P55

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 93
n. sheet 94

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 4
PSM
90-250VDC

-X11

4 +
5 -
/84.B3
90-250VDC
PE

-X11
2
3 /157.E7
1

BUSBAR RELAY FAULTY	
BUS-4 MAIN-1	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 4
TRM
1A, 50/60Hz

-X401

BAY_412_R PHASE		+ 1		
MYLASANDRA LINE				
P40#AI.01	CT: 1A	- 2	/80.A2	
BAY_412_Y PHASE		+ 3		
MYLASANDRA LINE				
P40#AI.02	CT: 1A	- 4	/80.B2	
BAY_412_B PHASE		+ 5		
MYLASANDRA LINE				
P40#AI.03	CT: 1A	- 6	/80.B2	
BAY_414_R PHASE		+ 7		
FUTURE LINE				
P40#AI.04	CT: 1A	- 8	/80.D2	
BAY_414_Y PHASE		+ 9		
FUTURE LINE				
P40#AI.05	CT: 1A	- 10	/80.D2	
BAY_414_B PHASE		+ 11		
FUTURE LINE				
P40#AI.06	CT: 1A	- 12	/80.E2	
BAY_417_R PHASE		+ 13		
BUS SECTION				
P40#AI.07	CT: 1A	- 14	/81.A2	
BAY_417_Y PHASE		+ 15		
BUS SECTION				
P40#AI.08	CT: 1A	- 16	/81.B2	
BAY_417_B PHASE		+ 17		
BUS SECTION				
P40#AI.09	CT: 1A	- 18	/81.B2	
BAY_426_R PHASE		+ 19		
FILTER-3				
P40#AI.10	CT: 1A	- 20	/81.D2	
BAY_426_Y PHASE		+ 21		
FILTER-3				
P40#AI.11	CT: 1A	- 22	/81.D2	
BAY_426_B PHASE		+ 23		
FILTER-3				
P40#AI.12	CT: 1A	- 24	/81.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 4
TRM
1A, 50/60Hz

-X401

BAY_435_R PHASE		+ 1		
FUTURE BAY				
P40#AI.01	CT: 1A	- 2	/82.A2	
BAY_435_Y PHASE		+ 3		
FUTURE BAY				
P40#AI.02	CT: 1A	- 4	/82.B2	
BAY_435_B PHASE		+ 5		
FUTURE BAY				
P40#AI.03	CT: 1A	- 6	/82.B2	
BAY_438_R PHASE		+ 7		
FUTURE BAY				
P40#AI.04	CT: 1A	- 8	/82.D2	
BAY_438_Y PHASE		+ 9		
FUTURE BAY				
P40#AI.05	CT: 1A	- 10	/82.D2	
BAY_438_B PHASE		+ 11		
FUTURE BAY				
P40#AI.06	CT: 1A	- 12	/82.E2	
BAY_441_R PHASE		+ 13		
FUTURE BAY				
P40#AI.07	CT: 1A	- 14	/83.A2	
BAY_441_Y PHASE		+ 15		
FUTURE BAY				
P40#AI.08	CT: 1A	- 16	/83.B2	
BAY_441_B PHASE		+ 17		
FUTURE BAY				
P40#AI.09	CT: 1A	- 18	/83.B2	
BAY_444_R PHASE		+ 19		
FUTURE BAY				
P40#AI.10	CT: 1A	- 20	/83.D2	
BAY_444_Y PHASE		+ 21		
FUTURE BAY				
P40#AI.11	CT: 1A	- 22	/83.D2	
BAY_444_B PHASE		+ 23		
FUTURE BAY				
P40#AI.12	CT: 1A	- 24	/83.E2	

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 94
n. sheet 95

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X31

MAIN 1 BUS 4 PROT IN	P3rBI.01	220-250VDC	1, 2
MAIN 1 BUS 4 PROT OUT	P3rBI.02	220-250VDC	3, 4
SPARE	P3rBI.03	220-250VDC	5, 6
TRIP RELAY OPTD 86A BUS-4	P3rBI.04	220-250VDC	7, 8
SPARE	P3rBI.05	220-250VDC	9, 10
SPARE	P3rBI.06	220-250VDC	11, 12
SPARE	P3rBI.07	220-250VDC	13, 14
REB670 RELAY FAULTY BUS 4 - MAIN 2	P3rBI.08	220-250VDC	15, 16

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X32

BAY412-EXT LBB OPERATED	P3rBI.09	220-250VDC	1, 2
BAY415-EXT LBB OPERATED	P3rBI.10	220-250VDC	3, 4
BAY417-EXT LBB OPERATED	P3rBI.11	220-250VDC	5, 6
BAY426-EXT LBB OPERATED	P3rBI.12	220-250VDC	7, 8
BAY435-EXT LBB OPERATED	P3rBI.13	220-250VDC	9, 10
BAY436-EXT LBB OPERATED	P3rBI.14	220-250VDC	11, 12
BAY441-EXT LBB OPERATED	P3rBI.15	220-250VDC	13, 14
BAY444-EXT LBB OPERATED	P3rBI.16	220-250VDC	15, 16

+D.05 -D00.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X41

BUS-4 BBLSB TRIP TO 86A	#BO.01	1, 2
BUS-4 LBB TRIP RLY RESET	#BO.02	3, 4
BAY-412 BPH LBB RETRIP-01	#BO.03	5, 6
BAY-412 YPH LBB RETRIP-02	#BO.04	7, 8
BAY-412 BPH LBB RETRIP-03	#BO.05	9, 10
BAY-415 BPH LBB RETRIP-04	#BO.06	11, 12
BAY-415 YPH LBB RETRIP-05	#BO.07	13, 14
BAY-415 BPH LBB RETRIP-06	#BO.08	15, 16
BAY-426 BPH LBB RETRIP-07	#BO.09	17, 18
BAY-426 YPH LBB RETRIP-08	#BO.10	19, 20
BUS-4 BBLBB TRIP	#BO.11	21, 22
BUS-4 LBB TRIP RLY RESET	#BO.12	23, 24

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X42

BUSBAR-4 OPTD ANNUNCIAT ON CKT	#BO.13	1, 2
BB-4 CT SUPVN ANNUNCIATION CKT	#BO.14	3, 4
BUSBAR-4 OPTD EVENT LOGGER CKT	#BO.15	5, 6
BB-4 CT SUPVN EVENT LOGGER CKT	#BO.16	7, 8
GENERAL TRIP	#BO.17	9, 10
GENERAL TRIP	#BO.18	11, 12
BB-4 MAIN-1 OPTD TO NTAMC	#BO.19	13, 14
BB-4 MAIN-1 CT SUPVN BLOCK TO NTAMC	#BO.20	15, 16
BB-4 MAIN-1 OUT OF SERVICE TO NTAMC	#BO.21	17, 18
BB-4 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	19, 20
SPARE 2 MI Block	#BO.23	21, 22
SPARE 24 MICZ opld	#BO.24	23, 24

Based on 3100135053	Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW
	Approved 20.04.2023	DEENADAYALAN A	
	Project POWER GRID CORPORATION OF IND A LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formally known as ABB Power Products and Systems India Limited)
Rev. Reason / old	Date	Name	

Doc. kind: Circuit diagram
doc EFS
Resp. dept. PG-GAS
Doc. no 1MNS801837-CGCA
Rev. no 00
Language en
Sheet 95
A sheet 96
Ref Des. =4R

1MYN061003-102(ASIREV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X61

BAY-426 BPH LBB RETRIP-M1	#BO.01	2 / 1	/93.D2
BAY-417 LBB RETRIP-M1	#BO.02	3	/93.E2
BAY-435 RPH LBB RETRIP-M1	#BO.03	5 / 4	/93.E2
BAY-435 YPH LBB RETRIP-M1	#BO.04	6	/93.E2
BAY-435 BPH LBB RETRIP-M1	#BO.05	8 / 7	/93.B6
BAY-438 RPH LBB RETRIP-M1	#BO.06	9	/93.B6
BAY-438 YPH LBB RETRIP-M1	#BO.07	11 / 10	/93.B6
BAY-438 BPH LBB RETRIP-M1	#BO.08	12	/93.C6
BAY-441 RPH LBB RETRIP-M1	#BO.09	14 / 13	/93.C6
BAY-441 YPH LBB RETRIP-M1	#BO.10	15	/93.C6
BAY-441 BPH LBB RETRIP-M1	#BO.11	17 / 16	/93.D6
BAY-444 RPH LBB RETRIP-M1	#BO.12	18	/93.D6

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X62

BAY-444 YPH LBB RETRIP-M1	#BO.13	2 / 1	/93.D6
BAY-444 BPH LBB RETRIP-M1	#BO.14	3	/93.E6
BUSBAR-4 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/174.E6
BB-4 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/174.E6
BAY-412 BB/LBB TRIP	#BO.17	8 / 7	
BAY-415 BB/LBB TRIP	#BO.18	9	
BAY-426 BB/LBB TRIP	#BO.19	11 / 10	
BAY-417 BB/LBB TRIP	#BO.20	12	
BAY-435 BB/LBB TRIP	#BO.21	14 / 13	
BAY-438 BB/LBB TRIP	#BO.22	15	
BAY-441 BB/LBB TRIP	#BO.23	17 / 16	
BAY-444 BB/LBB TRIP	#BO.24	18	

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 96
n. sheet 97
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X51

BAY-412 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	/87.B2
BAY-412 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	/87.B2
BAY-412 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	/87.C2
BAY-412 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	/87.C2
BAY-415 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	/87.D2
BAY-415 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	/87.D2
BAY-415 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	/87.E2
BAY-415 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	/87.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X52

SPARE		P5#BI.09	220-250VDC	/88.B2
SPARE		P5#BI.10	220-250VDC	/88.B2
SPARE		P5#BI.11	220-250VDC	/88.C2
BAY-417 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	/88.C2
BAY-426 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	/88.D2
BAY-426 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	/88.D2
BAY-426 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	/88.E2
BAY-426 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	/88.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X71

BAY-435 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	/89.B2
BAY-435 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	/89.B2
BAY-435 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	/89.C2
BAY-435 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	/89.C2
BAY-438 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	/89.D2
BAY-438 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	/89.D2
BAY-438 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	/89.E2
BAY-438 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	/89.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X72

BAY-441 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	/90.B2
BAY-441 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	/90.B2
BAY-441 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	/90.C2
BAY-441 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	/90.C2
BAY-444 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	/90.D2
BAY-444 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	/90.D2
BAY-444 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	/90.E2
BAY-444 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	/90.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

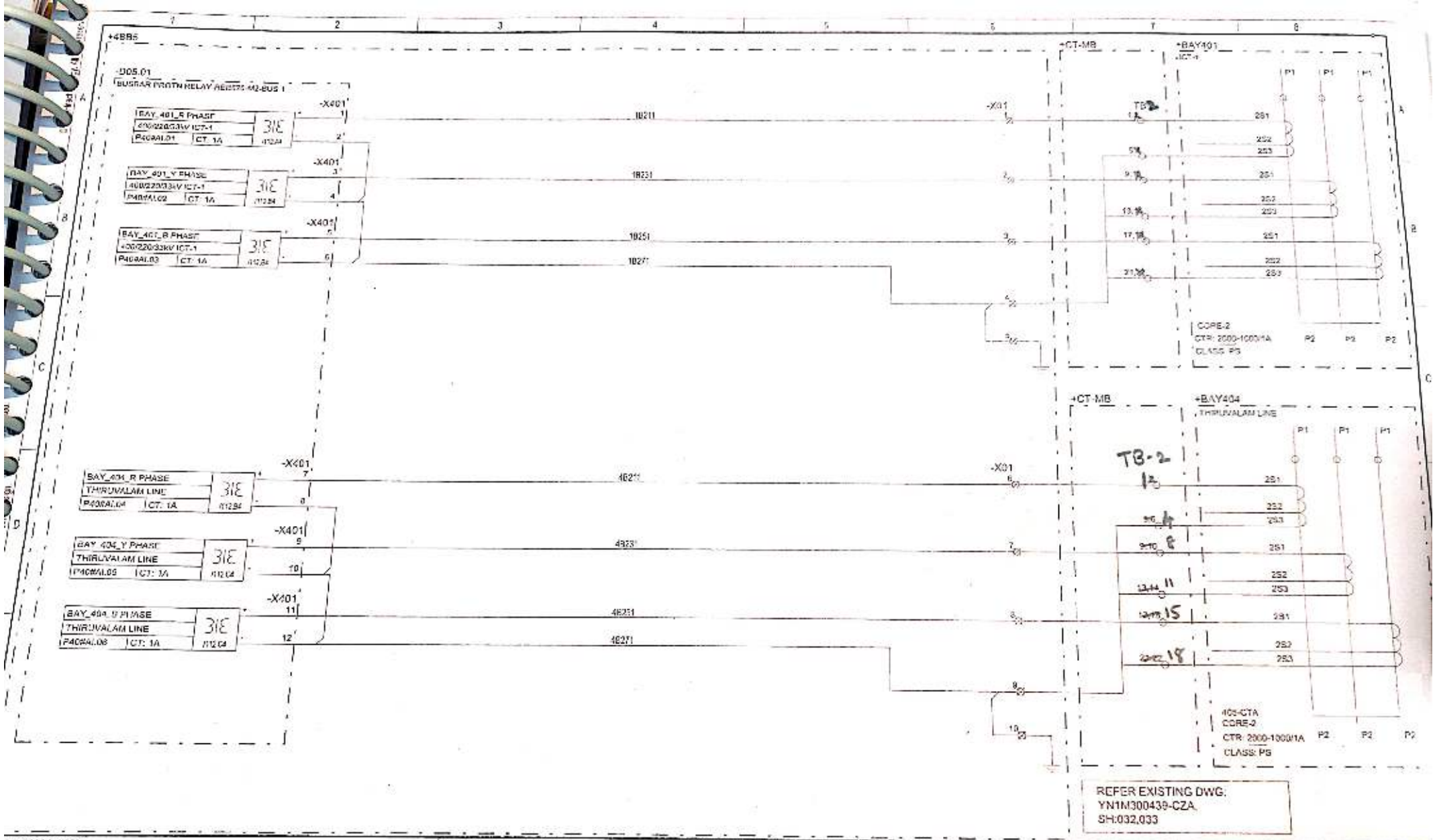
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 97
n. sheet 98

1MYN691003-102(A3)REV01

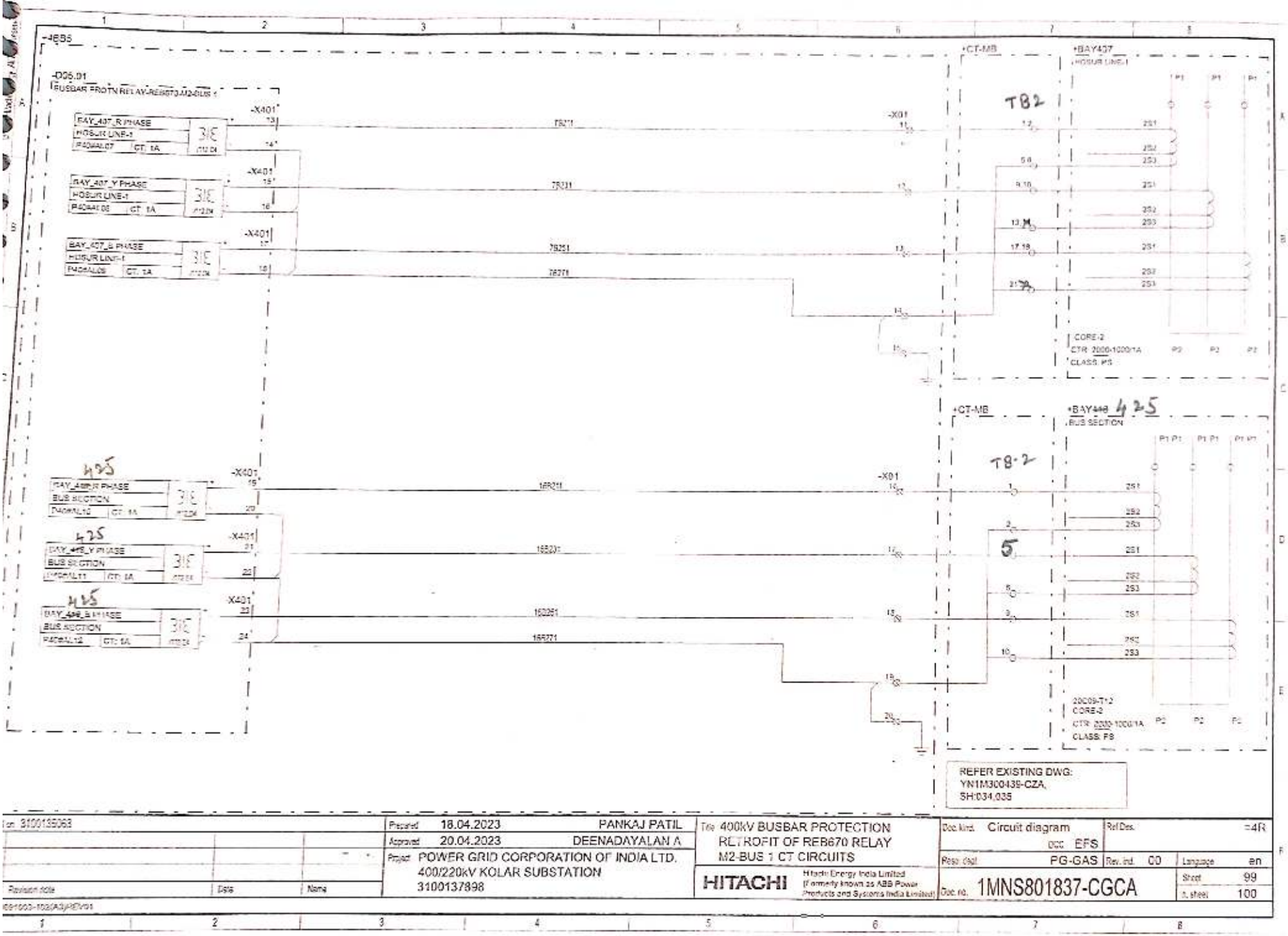
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 CT CIRCUITS	Doc.kind. Circuit diagram DOC EFS	Ref.Des.	
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev.ind. 00	Language
Revision note / Date / Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet / % sheet

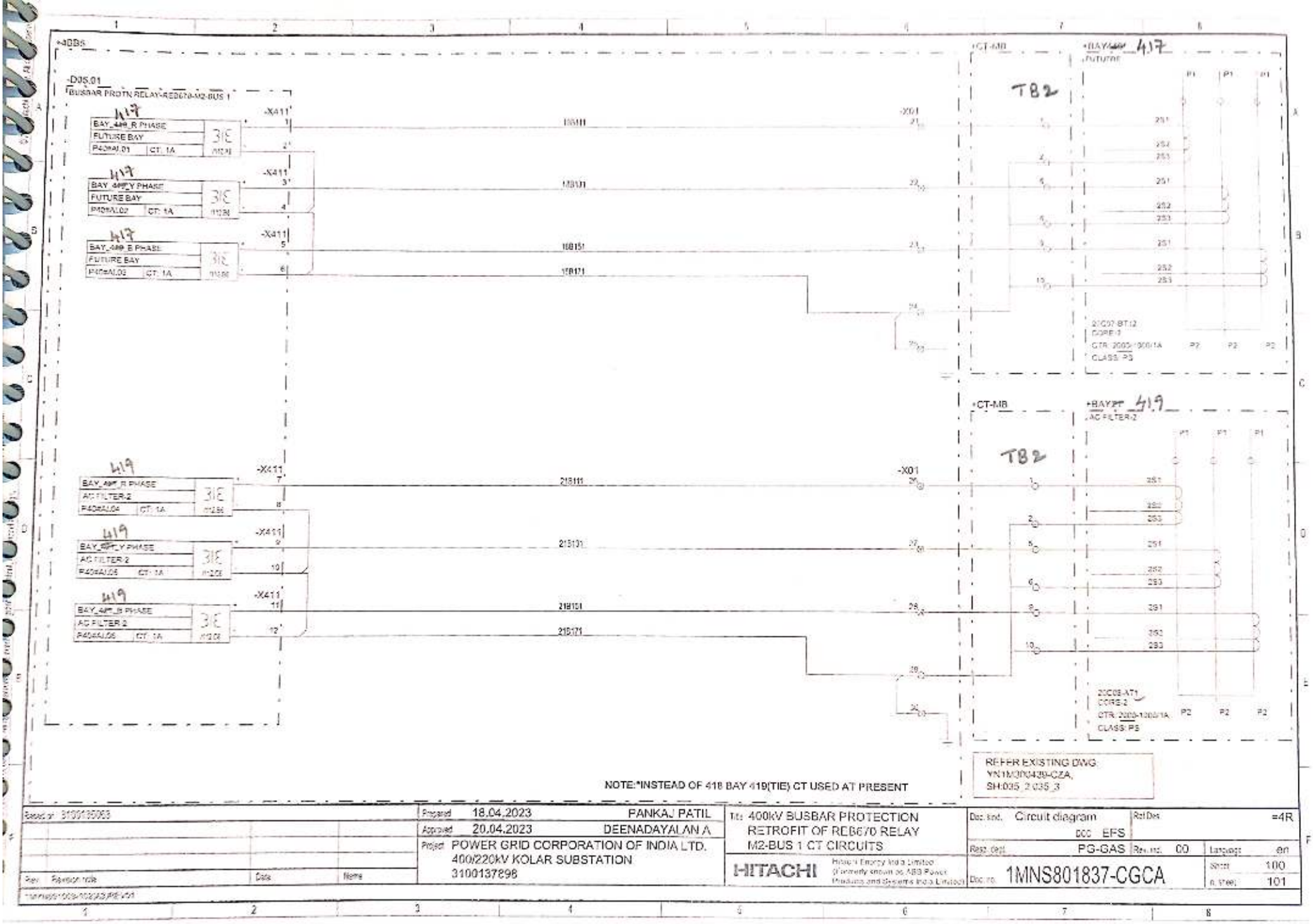
01503-102(A3)REV01

Scanned with OKEN Scanner

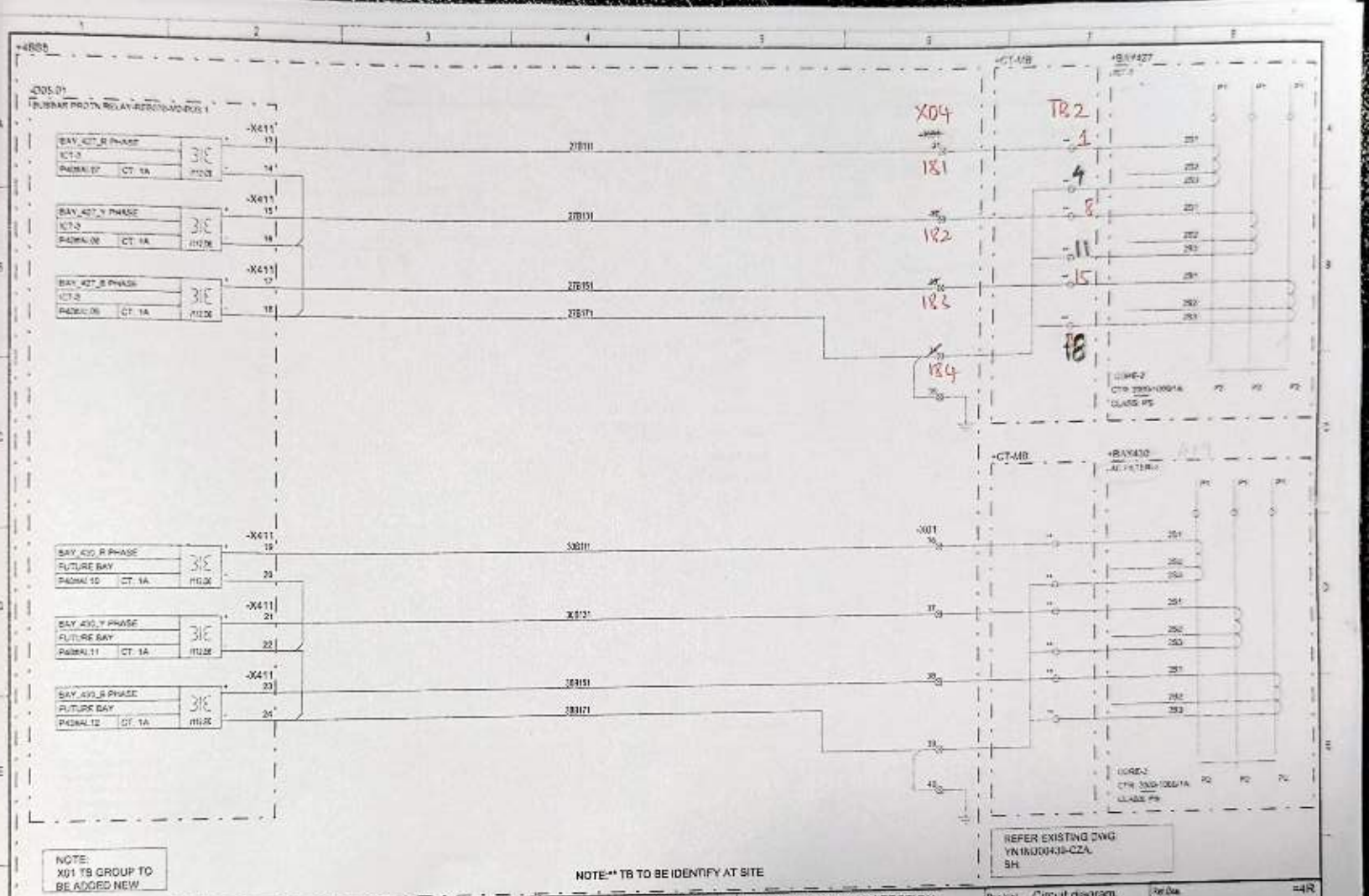


on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 CT CIRCUITS	Doc kind Circuit diagram	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		doc EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp dept PG-GAS	Rev. ind. 00	Language en
Revision note / Date / Name			Doc no. 1MNS801837-CGCA	Sheet 99	
				n. sheet 100	

Scanned with OKEN Scanner



Scanned with OKEN Scanner



Based on 3100135563			Prepared	18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RE3670 RELAY M2-BUS 1 CT CIRCUITS	Doc kind. Circuit diagram Doc EFS Resp. dept. PG-GAS Doc. no. 1MNS801837-CGCA Rev. no. 00 Language en Sheet 101 No. sheet 102
			Approved	20.04.2023	DEENADAYALAN A		
			Proj.	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137#98		HITACHI	
Rev.	Revision note	Date	Name				

© 2023 Hitachi Energy. All rights reserved.

+4BB5

FROM SH: 031/2

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

-X13 -813-01 -813-02

7 J5 1 2 4A

8 J6 1 2 4A

PSM
-X11
4 +
5 -
90-250VDC

PE
/112.B1

K201 +D.11-D11.02:1P3
/103.A5

K202 +B.05-1XX2:1
/103.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.101.101

Test
Normal

1B	1A	
2B	2A	
3B	3A	/98.A4
4B	4A	/98.B4
5B	5A	/98.B4
6B	6A	/98.B4
7B	7A	/98.D4
8B	8A	/98.D4
9B	9A	/98.E4
10B	10A	/98.E4
11B	11A	/99.A4
12B	12A	/99.B4
13B	13A	/99.B4
14B	14A	/99.B4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.113.101

Test
Normal

1B	1A	
2B	2A	
3B	3A	/99.D4
4B	4A	/99.D4
5B	5A	/99.E4
6B	6A	/99.E4
7B	7A	/100.A4
8B	8A	/100.B4
9B	9A	/100.C4
10B	10A	/100.B4
11B	11A	/100.D4
12B	12A	/100.D4
13B	13A	/100.E4
14B	14A	/100.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.125.101

Test
Normal

1B	1A	
2B	2A	
3B	3A	/101.A4
4B	4A	/101.B4
5B	5A	/101.B4
6B	6A	/101.B4
7B	7A	/101.D4
8B	8A	/101.D4
9B	9A	/101.E4
10B	10A	/101.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 037

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 102
n. sheet 103

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

+D.05-D05.01:5 (-X11) /102.B2
K202

+D.05-D05.01:4 (-X11) /102.B2
K201

-X31 1	MAIN 2 BUS 1 PROT IN	P3#BI.01	220-250VDC	/113.A2
-X31 3	MAIN 2 BUS 1 PROT OUT	P3#BI.02	220-250VDC	/113.B2
-X31 5	SPARE	P3#BI.03	220-250VDC	/113.B2
-X31 7	TRIP RELAY RESET 96B BUS-1	P3#BI.04	220-250VDC	/113.B2
-X31 9	SPARE	P3#BI.05	220-250VDC	/113.C2
-X31 11	SPARE	P3#BI.06	220-250VDC	/113.C2
-X31 13	SPARE	P3#BI.07	220-250VDC	/113.C2
-X31 15	REB670 RELAY FAULTY BUS 1 - MAIN 1	P3#BI.08	220-250VDC	/113.D2

-1XX2 1

K203 -D11.02 1P3 1P4 /103.B8 IN
BB-1 M2 IN/OUT SWITCH

K204 -D11.02 1P2 /103.A8 OUT 1P1
BB-1 M2 IN/OUT SWITCH

K205 -5X04 1
K201 /171.B4

K206 -5X04 2
K206 /171.A1
+D.13-D13.101.101:221

K207 3

K208 4

K209 5

-X14A 3

K210 4

-D11.02
1P2 /103.B4
1P1 C
1P3 1P4 /103.B3
A
2P2
2P1 C
2P3 2P4
A
3P2
3P1 C
3P3 3P4
A
4P2
4P1 C
4P3 4P4
A
IN A
OUT C
BB-1 M2 IN/OUT SWITCH

+4BB1
+D.05
-X14A 3
-X11 2
4 3
1
/40.B2
BB RELAY FAULTY
BUS-1 MAIN-1

NOTE:
5X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 037

+B.05-1XX2:2
/104.A3
K202

+B.17-X04:13
/104.A5
K201

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

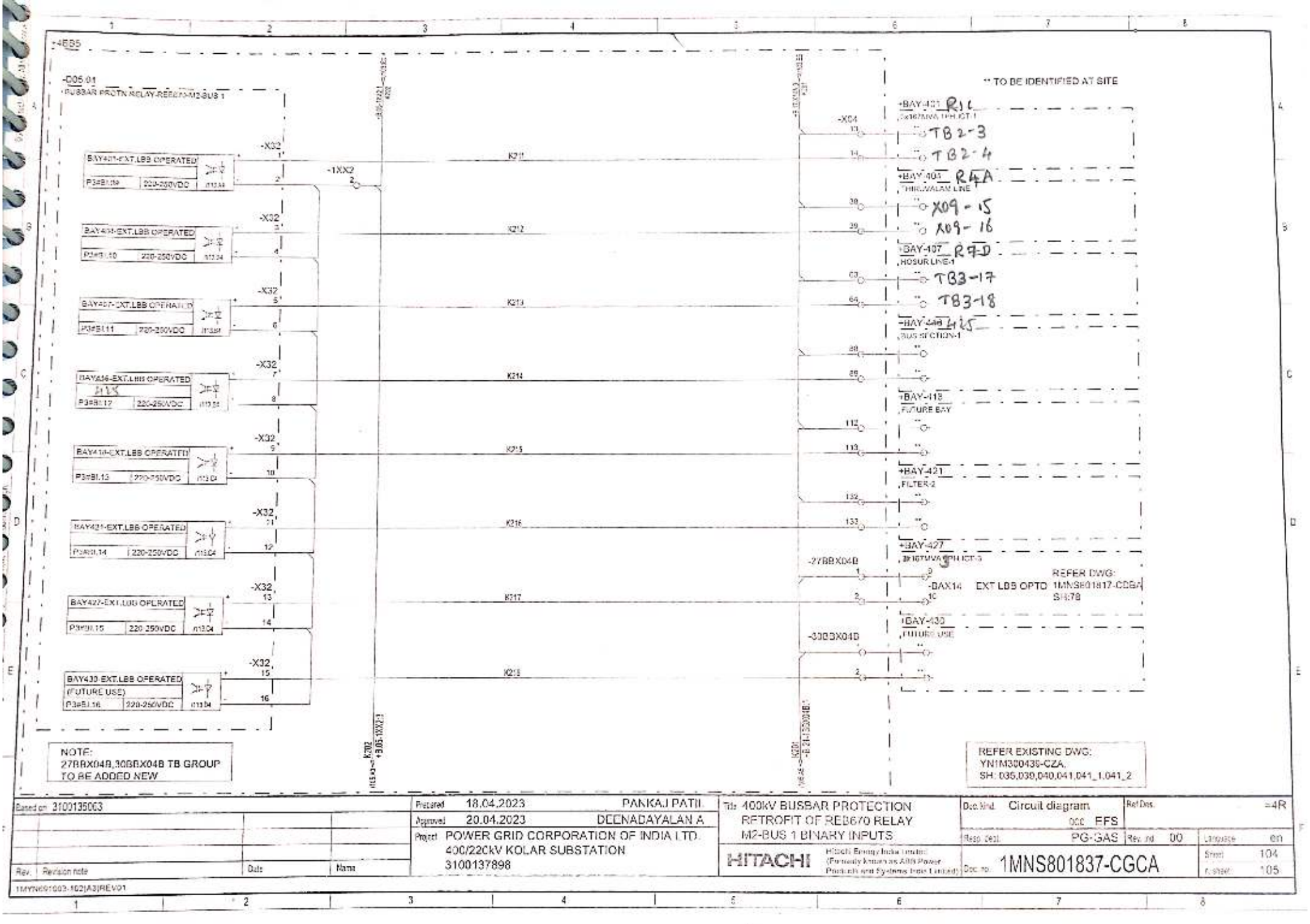
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 103
Doc. no. 1MNS801837-CGCA
n. sheet 104

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135003	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS	Doc kind Circuit diagram	Ref Des. =4R	
	Approved 20.04.2023 DEENADAYALAN A		Doc cat. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/22kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind 00	Language en
			Doc. no. 1MNS801837-CGCA	Sheet 104	
Rev. Revision note Date Name				f. sheet 105	

1MYN691003-162|A3|REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /104.E3
+B.05-1XX2:2

K201 /104.E5
+B.33-30BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X51 + 1	K219	-1XX2 3
P5#BI.01	220-250VDC	- 2		/115.A2
SPARE		-X51 + 3	K220	
P5#BI.02	220-250VDC	- 4		/115.B2
SPARE		-X51 + 5	K221	
P5#BI.03	220-250VDC	- 6		/115.B2
BAY-401 3PH LBB INIT. (FUTURE USE)		-X51 + 7	K222	
P5#BI.04	220-250VDC	- 8		/115.B2
BAY-404 RPH LBB INIT. (FUTURE USE)		-X51 + 9	K223	
P5#BI.05	220-250VDC	- 10		/115.C2
BAY-404 YPH LBB INIT. (FUTURE USE)		-X51 + 11	K224	
P5#BI.06	220-250VDC	- 12		/115.C2
BAY-404 BPH LBB INIT. (FUTURE USE)		-X51 + 13	K225	
P5#BI.07	220-250VDC	- 14		/115.C2
BAY-404 3PH LBB INIT. (FUTURE USE)		-X51 + 15	K226	
P5#BI.08	220-250VDC	- 16		/115.D2

-1BBX04B
1 2 3 4 5 → ** ** ** ** **

+BAY-401
3x167MVA 1PH ICT-1
REF.DRG.NO:####
SHT.NO:##

-4BBX04B
1 2 3 4 5 → ** ** ** ** **

+BAY-404
THIRUVALAM LINE
REF.DRG.NO:####
SHT.NO:##

NOTE:
1BBX04B,4BBX04B TB GROUP
TO BE ADDED NEW

K202 /106.A3
+B.05-1XX2:4

K201 /106.A5
+B.25-7BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 105
n. sheet 106
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /105.E3
+B.05-1XX2:3

K201 /105.E5
+B.21-4BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-407 RPH LBB INIT.		-X52	1	+
(FUTURE USE)				
P5#BI.09	220-250VDC	/115.A4	2	-

-1XX2 4

K227

-7BBX04B 1

+BAY-407
HOSUR LINE-1
REF.DRG.NO:####
SHT.NO:##

BAY-407 YPH LBB INIT.		-X52	3	+
(FUTURE USE)				
P5#BI.10	220-250VDC	/115.B4	4	-

K228

BAY-407 BPH LBB INIT.		-X52	5	+
(FUTURE USE)				
P5#BI.11	220-250VDC	/115.B4	6	-

K229

BAY-407 3PH LBB INIT.		-X52	7	+
(FUTURE USE)				
P5#BI.12	220-250VDC	/115.B4	8	-

K230

SPARE		-X52	9	+
P5#BI.13	220-250VDC	/115.C4	10	-

K231

SPARE		-X52	11	+
P5#BI.14	220-250VDC	/115.C4	12	-

K232

SPARE		-X52	13	+
P5#BI.15	220-250VDC	/115.C4	14	-

K233

BAY-416 3PH LBB INIT.		-X52	15	+
(FUTURE USE)				
P5#BI.16	220-250VDC	/115.D4	16	-

K234

-10BBX04B 1

+BAY-416
BUS SECTION-1
REF.DRG.NO:####
SHT.NO:##

NOTE:
7BBX04B,10BBX04B TB GROUP
TO BE ADDED NEW

K202 /107.A3
+B.05-1XX2:5

K201 /107.A5
+B.29-18BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 106
n. sheet 107

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /106.E3
+B.05-1XX2:4

K201 /106.E5
+B.25-10BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-419 RPH LBB INIT.		-X71 + 1	K235	-18BBX04B 1
(FUTURE USE)				2
P7#BI.01	220-250VDC	/115.A6 - 2	-1XX2 5	
BAY-419 YPH LBB INIT.		-X71 + 3	K236	3
(FUTURE USE)				
P7#BI.02	220-250VDC	/115.B6 - 4		
BAY-419 BPH LBB INIT.		-X71 + 5	K237	4
(FUTURE USE)				
P7#BI.03	220-250VDC	/115.B6 - 6		
BAY-419 3PH LBB INIT.		-X71 + 7	K238	5
(FUTURE USE)				
P7#BI.04	220-250VDC	/115.B6 - 8		

+BAY-419
TIE BAY
REF.DRG.NO:####
SHT.NO:##

BAY-421 RPH LBB INIT.		-X71 + 9	K239	-21BBX04B 1
(FUTURE USE)				2
P7#BI.05	220-250VDC	/115.C6 - 10		
BAY-421 YPH LBB INIT.		-X71 + 11	K240	3
(FUTURE USE)				
P7#BI.06	220-250VDC	/115.C6 - 12		
BAY-421 BPH LBB INIT.		-X71 + 13	K241	4
(FUTURE USE)				
P7#BI.07	220-250VDC	/115.C6 - 14		
BAY-421 3PH LBB INIT.		-X71 + 15	K242	5
(FUTURE USE)				
P7#BI.08	220-250VDC	/115.D6 - 16		

+BAY-421
FILTER-2
REF.DRG.NO:####
SHT.NO:##

NOTE:
18BBX04B,21BBX04B TB GROUP
TO BE ADDED NEW

K202 /108.A3
+B.05-1XX2:6

K201 /108.A5
+B.33-27BBX04B:3

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 107
n. sheet 108

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /107.E3
+B.05-1XX2:5

K201 /107.E5
+B.29-21BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X72	1	+	K243
P7#BI.09	220-250VDC	/115.A7	2	-	-1XX2 6
SPARE		-X72	3	+	K244
P7#BI.10	220-250VDC	/115.B7	4	-	
SPARE		-X72	5	+	K245
P7#BI.11	220-250VDC	/115.B7	6	-	
BAY-427 3PH LBB INIT.		-X72	7	+	K246
(FUTURE USE)					
P7#BI.12	220-250VDC	/115.B7	8	-	
BAY-430 RPH LBB INIT.		-X72	9	+	K247
(FUTURE USE)					
P7#BI.13	220-250VDC	/115.C7	10	-	
BAY-430 YPH LBB INIT.		-X72	11	+	K248
(FUTURE USE)					
P7#BI.14	220-250VDC	/115.C7	12	-	
BAY-430 BPH LBB INIT.		-X72	13	+	K249
(FUTURE USE)					
P7#BI.15	220-250VDC	/115.C7	14	-	
BAY-430 3PH LBB INIT.		-X72	15	+	K250
(FUTURE USE)					
P7#BI.16	220-250VDC	/115.D7	16	-	

-27BBX04B

+BAY-427
3x167MVA 1PH ICT-3
REF.DRG.NO:####
SHT.NO:##

-30BBX04B

+BAY-430
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

NOTE:
27BBX04B,30BBX04B TB GROUP
TO BE ADDED NEW

K202 /110.A5 +B.17-X04:154

K201 /110.A5 +D.05-D05.01:2 (-X41)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

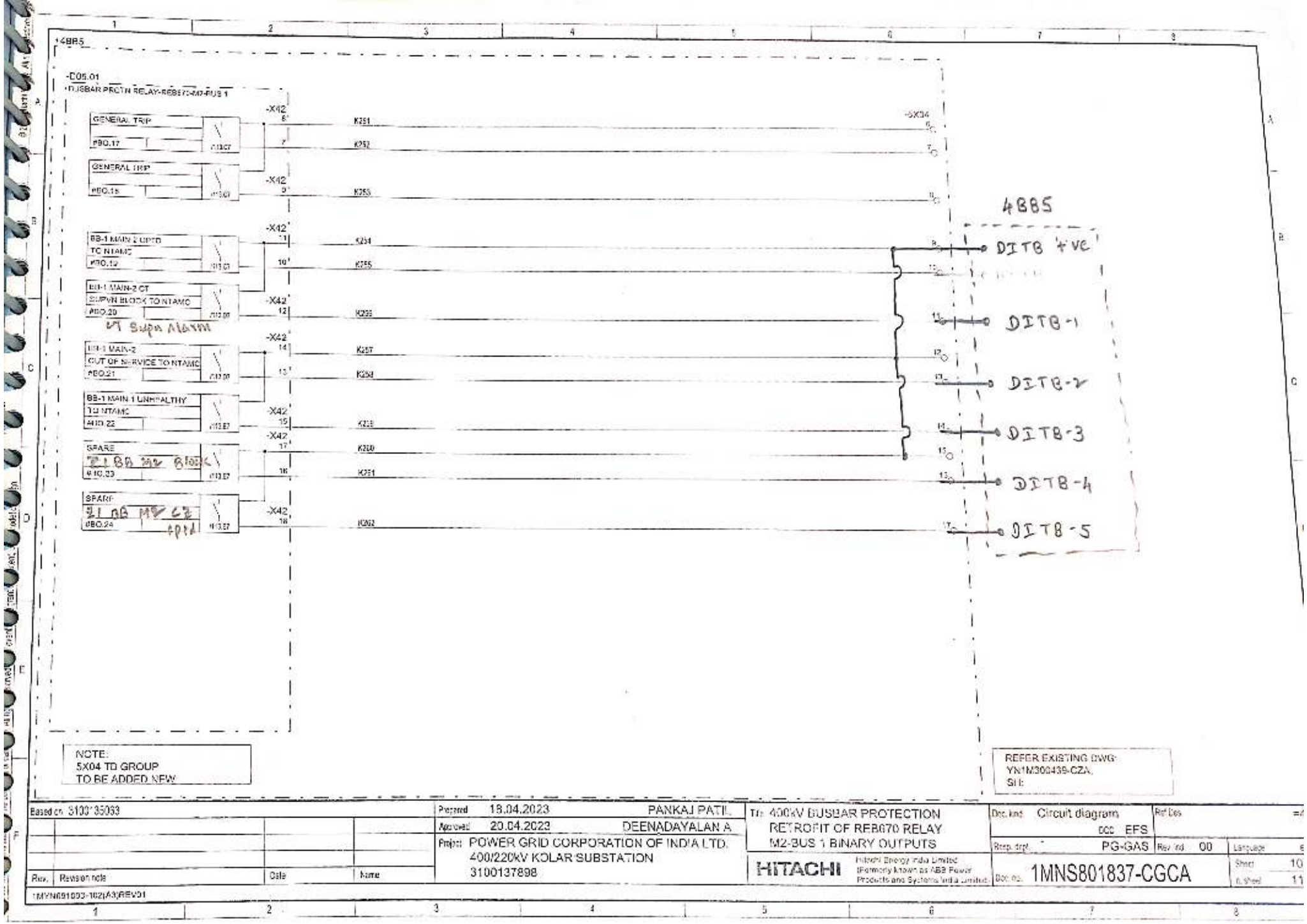
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

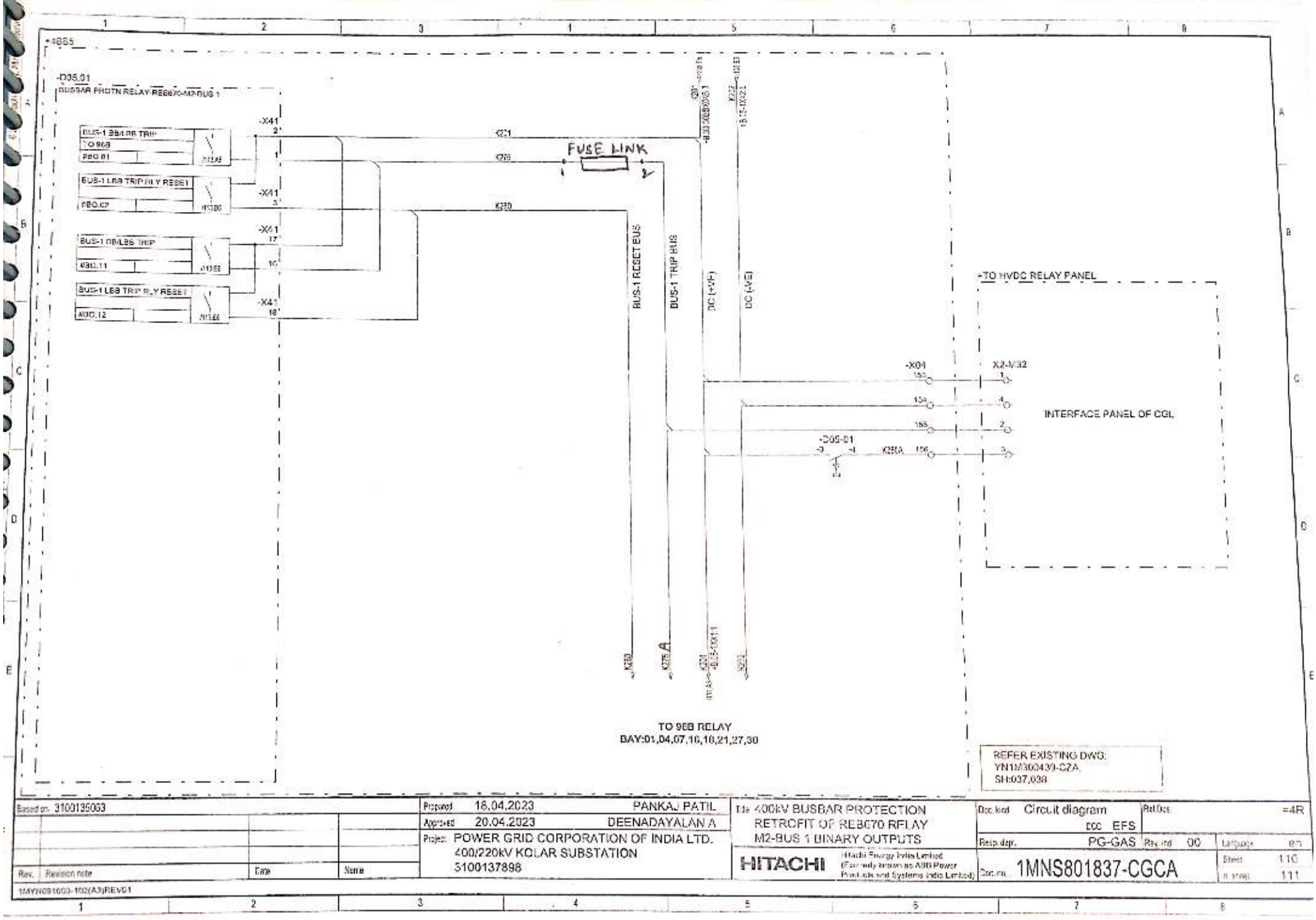
HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 108
n. sheet 109
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01



Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K201 ◁/110.E5
-D05-01:-3

BAY-401 LBB RETRIP-M2	#BO.03	/113.B6	-X41 5 / 4	-1XX1 1	5P13 → -5X04 18
BAY-404 RPH LBB RETRIP-M2	#BO.04	/113.C6	-X41 6		5P15 → 19
BAY-404 YPH LBB RETRIP-M2	#BO.05	/113.C6	-X41 8 / 7		5P17 → 20
BAY-404 BPH LBB RETRIP-M2	#BO.06	/113.C6	-X41 9		5P19 → 21
BAY-407 RPH LBB RETRIP-M2	#BO.07	/113.C6	-X41 11 / 10	-1XX1 2	5P21 → 22
BAY-407 YPH LBB RETRIP-M2	#BO.08	/113.D6	-X41 12		5P23 → 23
BAY-407 BPH LBB RETRIP-M2	#BO.09	/113.D6	-X41 14 / 13		5P25 → 24
BAY-416 LBB RETRIP-M2	#BO.10	/113.E6	-X41 15		5P27 → 25

K201 ◁/111.A6
+B.05-1XX1:3

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K201 ◁/111.E3
+B.05-1XX1:2

BAY-419 RPH LBB RETRIP-M2	#BO.01	/114.A2	-X61 2 / 1	-1XX1 3	5P29 → -5X04 26
BAY-419 YPH LBB RETRIP-M2	#BO.02	/114.B2	-X61 3		5P31 → 27
BAY-419 BPH LBB RETRIP-M2	#BO.03	/114.B2	-X61 5 / 4		5P33 → 28
BAY-421 RPH LBB RETRIP-M2	#BO.04	/114.C2	-X61 6		5P35 → 29
BAY-421 YPH LBB RETRIP-M2	#BO.05	/114.C2	-X61 8 / 7	-1XX1 4	5P37 → 30
BAY-421 BPH LBB RETRIP-M2	#BO.06	/114.C2	-X61 9		5P39 → 31
BAY-427 LBB RETRIP-M2	#BO.07	/114.C2	-X61 11 / 10		5P41 → 32
BAY-430 RPH LBB RETRIP-M2	#BO.08	/114.D2	-X61 12		5P43 → 33
BAY-430 YPH LBB RETRIP-M2	#BO.09	/114.D2	-X61 14 / 13	-1XX1 5	5P45 → 34
BAY-430 BPH LBB RETRIP-M2	#BO.10	/114.E2	-X61 15		5P47 → 35

NOTE:
1XX1, 5X04 TB GROUP
TO BE ADDED NEW

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 111
n. sheet 112

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 1
PSM
90-250VDC

-X11

4 +
5 -
/102.B3
90-250VDC
PE

-X11
2
3 /31.E7
1

BB RELAY FAULTY
BUS-1 MAIN2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 1
TRM
1A, 50/60Hz

-X401

BAY_401_R PHASE		+ 1		
400/220/33kV ICT-1				
P40#AI.01	CT: 1A	- 2		/98.A2
BAY_401_Y PHASE		+ 3		
400/220/33kV ICT-1				
P40#AI.02	CT: 1A	- 4		/98.B2
BAY_401_B PHASE		+ 5		
400/220/33kV ICT-1				
P40#AI.03	CT: 1A	- 6		/98.B2
BAY_404_R PHASE		+ 7		
THIRUVALAM LINE				
P40#AI.04	CT: 1A	- 8		/98.D2
BAY_404_Y PHASE		+ 9		
THIRUVALAM LINE				
P40#AI.05	CT: 1A	- 10		/98.D2
BAY_404_B PHASE		+ 11		
THIRUVALAM LINE				
P40#AI.06	CT: 1A	- 12		/98.E2
BAY_407_R PHASE		+ 13		
HOSUR LINE-1				
P40#AI.07	CT: 1A	- 14		/99.A2
BAY_407_Y PHASE		+ 15		
HOSUR LINE-1				
P40#AI.08	CT: 1A	- 16		/99.B2
BAY_407_B PHASE		+ 17		
HOSUR LINE-1				
P40#AI.09	CT: 1A	- 18		/99.B2
BAY_416_R PHASE		+ 19		
BUS SECTION				
P40#AI.10	CT: 1A	- 20		/99.D2
BAY_416_Y PHASE		+ 21		
BUS SECTION				
P40#AI.11	CT: 1A	- 22		/99.D2
BAY_416_B PHASE		+ 23		
BUS SECTION				
P40#AI.12	CT: 1A	- 24		/99.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 1
TRM
1A, 50/60Hz

-X411

BAY_419_R PHASE		+ 1		
FUTURE BAY				
P40#AI.01	CT: 1A	- 2		/100.A2
BAY_419_Y PHASE		+ 3		
FUTURE BAY				
P40#AI.02	CT: 1A	- 4		/100.B2
BAY_419_B PHASE		+ 5		
FUTURE BAY				
P40#AI.03	CT: 1A	- 6		/100.B2
BAY_421_R PHASE		+ 7		
AC FILTER-2				
P40#AI.04	CT: 1A	- 8		/100.D2
BAY_421_Y PHASE		+ 9		
AC FILTER-2				
P40#AI.05	CT: 1A	- 10		/100.D2
BAY_421_B PHASE		+ 11		
AC FILTER-2				
P40#AI.06	CT: 1A	- 12		/100.E2
BAY_427_R PHASE		+ 13		
ICT-3				
P40#AI.07	CT: 1A	- 14		/101.A2
BAY_427_Y PHASE		+ 15		
ICT-3				
P40#AI.08	CT: 1A	- 16		/101.B2
BAY_427_B PHASE		+ 17		
ICT-3				
P40#AI.09	CT: 1A	- 18		/101.B2
BAY_430_R PHASE		+ 19		
FUTURE BAY				
P40#AI.10	CT: 1A	- 20		/101.D2
BAY_430_Y PHASE		+ 21		
FUTURE BAY				
P40#AI.11	CT: 1A	- 22		/101.D2
BAY_430_B PHASE		+ 23		
FUTURE BAY				
P40#AI.12	CT: 1A	- 24		/101.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 112
n. sheet 113

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X31

MAIN 2 BUS 1 PROT IN	P3#BI.01	220-250VDC	+ 1 - 2	/103.B2
MAIN 2 BUS 1 PROT OUT	P3#BI.02	220-250VDC	+ 3 - 4	/103.B2
SPARE	P3#BI.03	220-250VDC	+ 5 - 6	/103.C2
TRIP RELAY RESET 96B BUS-1	P3#BI.04	220-250VDC	+ 7 - 8	/103.C2
SPARE	P3#BI.05	220-250VDC	+ 9 - 10	/103.C2
SPARE	P3#BI.06	220-250VDC	+ 11 - 12	/103.D2
SPARE	P3#BI.07	220-250VDC	+ 13 - 14	/103.D2
REB670 RELAY FAULTY BUS 1 - MAIN 1	P3#BI.08	220-250VDC	+ 15 - 16	/103.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X32

BAY401-EXT.LBB OPERATED	P3#BI.09	220-250VDC	+ 1 - 2	/104.B2
BAY404-EXT.LBB OPERATED	P3#BI.10	220-250VDC	+ 3 - 4	/104.B2
BAY407-EXT.LBB OPERATED	P3#BI.11	220-250VDC	+ 5 - 6	/104.C2
BAY416-EXT.LBB OPERATED	P3#BI.12	220-250VDC	+ 7 - 8	/104.C2
BAY418-EXT.LBB OPERATED	P3#BI.13	220-250VDC	+ 9 - 10	/104.D2
BAY421-EXT.LBB OPERATED	P3#BI.14	220-250VDC	+ 11 - 12	/104.D2
BAY427-EXT.LBB OPERATED	P3#BI.15	220-250VDC	+ 13 - 14	/104.E2
BAY430-EXT.LBB OPERATED (FUTURE USE)	P3#BI.16	220-250VDC	+ 15 - 16	/104.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

-X41

BUS-1 BB/LBB TRIP TO 96B	#BO.01	2 1	/110.B2
BUS-1 LBB TRIP RLY RESET	#BO.02	3	/110.B2
BAY-401 LBB RETRIP-M2	#BO.03	5 4	/111.B2
BAY-404 RPH LBB RETRIP-M2	#BO.04	6	/111.B2
BAY-404 YPH LBB RETRIP-M2	#BO.05	8 7	/111.B2
BAY-404 BPH LBB RETRIP-M2	#BO.06	9	/111.C2
BAY-407 RPH LBB RETRIP-M2	#BO.07	11 10	/111.C2
BAY-407 YPH LBB RETRIP-M2	#BO.08	12	/111.C2
BAY-407 BPH LBB RETRIP-M2	#BO.09	14 13	/111.D2
BAY-416 LBB RETRIP-M2	#BO.10	15	/111.D2
BUS-1 BB/LBB TRIP	#BO.11	17 16	/110.B2
BUS-1 LBB TRIP RLY RESET	#BO.12	18	/110.C2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

-X42

BUSBAR-1 OPTD ANNUNCIATION CKT	#BO.13	2 1	/173.B5
BB-1 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.C5
BUSBAR-1 Rph OPTD EVENT LOGGER CKT	#BO.15	5 4	/175.A2
BUSBAR-1 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.B2
GENERAL TRIP	#BO.17	8 7	/109.A2
GENERAL TRIP	#BO.18	9	/109.B2
BB-1 MAIN-2 OPTD TO NTAMC	#BO.19	11 10	/109.B2
BB-1 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/109.C2
BB-1 MAIN-2 OUT OF SERVICE TO NTAMC	#BO.21	14 13	/109.C2
BB-1 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/109.C2
SPARE	#BO.23	17 16	/109.D2
SPARE	#BO.24	18	/109.D2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 113
n. sheet 114

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

-X61

BAY-419 RPH LBB RETRIP-M2 / #BO.01	2 / 1	/111.B5	
BAY-419 YPH LBB RETRIP-M2 / #BO.02	3	/111.B5	
BAY-419 BPH LBB RETRIP-M2 / #BO.03	5 / 4	/111.B5	
BAY-421 RPH LBB RETRIP-M2 / #BO.04	6	/111.C5	
BAY-421 YPH LBB RETRIP-M2 / #BO.05	8 / 7	/111.C5	
BAY-421 BPH LBB RETRIP-M2 / #BO.06	9	/111.C5	
BAY-427 LBB RETRIP-M2 / #BO.07	11 / 10	/111.D5	
BAY-430 RPH LBB RETRIP-M2 / #BO.08	12	/111.D5	
BAY-430 YPH LBB RETRIP-M2 / #BO.09	14 / 13	/111.D5	
BAY-430 BPH LBB RETRIP-M2 / #BO.10	15	/111.E5	
BUSBAR-1 Bph OPTD / EVENT LOGGER CKT / #BO.11	17 / 16	/175.B2	
BB-1 CT SUPVN / EVENT LOGGER CKT / #BO.12	18	/175.B2	

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

X62

SPARE / #BO.13	2 / 1		
SPARE / #BO.14	3		
SPARE / #BO.15	5 / 4		
SPARE / #BO.16	6		
SPARE / #BO.17	8 / 7		
SPARE / #BO.18	9		
SPARE / #BO.19	11 / 10		
SPARE / #BO.20	12		
SPARE / #BO.21	14 / 13		
SPARE / #BO.22	15		
SPARE / #BO.23	17 / 16		
SPARE / #BO.24	18		

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 114
n. sheet 115

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X51

SPARE	P5#BI.01	220-250VDC	1 / 2	/105.B2
SPARE	P5#BI.02	220-250VDC	3 / 4	/105.B2
SPARE	P5#BI.03	220-250VDC	5 / 6	/105.C2
BAY-401 3PH LBB INIT. (FUTURE USE)	P5#BI.04	220-250VDC	7 / 8	/105.C2
BAY-404 RPH LBB INIT. (FUTURE USE)	P5#BI.05	220-250VDC	9 / 10	/105.D2
BAY-404 YPH LBB INIT. (FUTURE USE)	P5#BI.06	220-250VDC	11 / 12	/105.D2
BAY-404 BPH LBB INIT. (FUTURE USE)	P5#BI.07	220-250VDC	13 / 14	/105.E2
BAY-404 3PH LBB INIT. (FUTURE USE)	P5#BI.08	220-250VDC	15 / 16	/105.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X52

BAY-407 RPH LBB INIT. (FUTURE USE)	P5#BI.09	220-250VDC	1 / 2	/106.B2
BAY-407 YPH LBB INIT. (FUTURE USE)	P5#BI.10	220-250VDC	3 / 4	/106.B2
BAY-407 BPH LBB INIT. (FUTURE USE)	P5#BI.11	220-250VDC	5 / 6	/106.C2
BAY-407 3PH LBB INIT. (FUTURE USE)	P5#BI.12	220-250VDC	7 / 8	/106.C2
SPARE	P5#BI.13	220-250VDC	9 / 10	/106.D2
SPARE	P5#BI.14	220-250VDC	11 / 12	/106.D2
SPARE	P5#BI.15	220-250VDC	13 / 14	/106.E2
BAY-416 3PH LBB INIT. (FUTURE USE)	P5#BI.16	220-250VDC	15 / 16	/106.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X71

BAY-419 RPH LBB INIT. (FUTURE USE)	P7#BI.01	220-250VDC	1 / 2	/107.B2
BAY-419 YPH LBB INIT. (FUTURE USE)	P7#BI.02	220-250VDC	3 / 4	/107.B2
BAY-419 BPH LBB INIT. (FUTURE USE)	P7#BI.03	220-250VDC	5 / 6	/107.C2
BAY-419 3PH LBB INIT. (FUTURE USE)	P7#BI.04	220-250VDC	7 / 8	/107.C2
BAY-421 RPH LBB INIT. (FUTURE USE)	P7#BI.05	220-250VDC	9 / 10	/107.D2
BAY-421 YPH LBB INIT. (FUTURE USE)	P7#BI.06	220-250VDC	11 / 12	/107.D2
BAY-421 BPH LBB INIT. (FUTURE USE)	P7#BI.07	220-250VDC	13 / 14	/107.E2
BAY-421 3PH LBB INIT. (FUTURE USE)	P7#BI.08	220-250VDC	15 / 16	/107.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X72

SPARE	P7#BI.09	220-250VDC	1 / 2	/108.B2
SPARE	P7#BI.10	220-250VDC	3 / 4	/108.B2
SPARE	P7#BI.11	220-250VDC	5 / 6	/108.C2
BAY-427 3PH LBB INIT. (FUTURE USE)	P7#BI.12	220-250VDC	7 / 8	/108.C2
BAY-430 RPH LBB INIT. (FUTURE USE)	P7#BI.13	220-250VDC	9 / 10	/108.D2
BAY-430 YPH LBB INIT. (FUTURE USE)	P7#BI.14	220-250VDC	11 / 12	/108.D2
BAY-430 BPH LBB INIT. (FUTURE USE)	P7#BI.15	220-250VDC	13 / 14	/108.E2
BAY-430 3PH LBB INIT. (FUTURE USE)	P7#BI.16	220-250VDC	15 / 16	/108.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

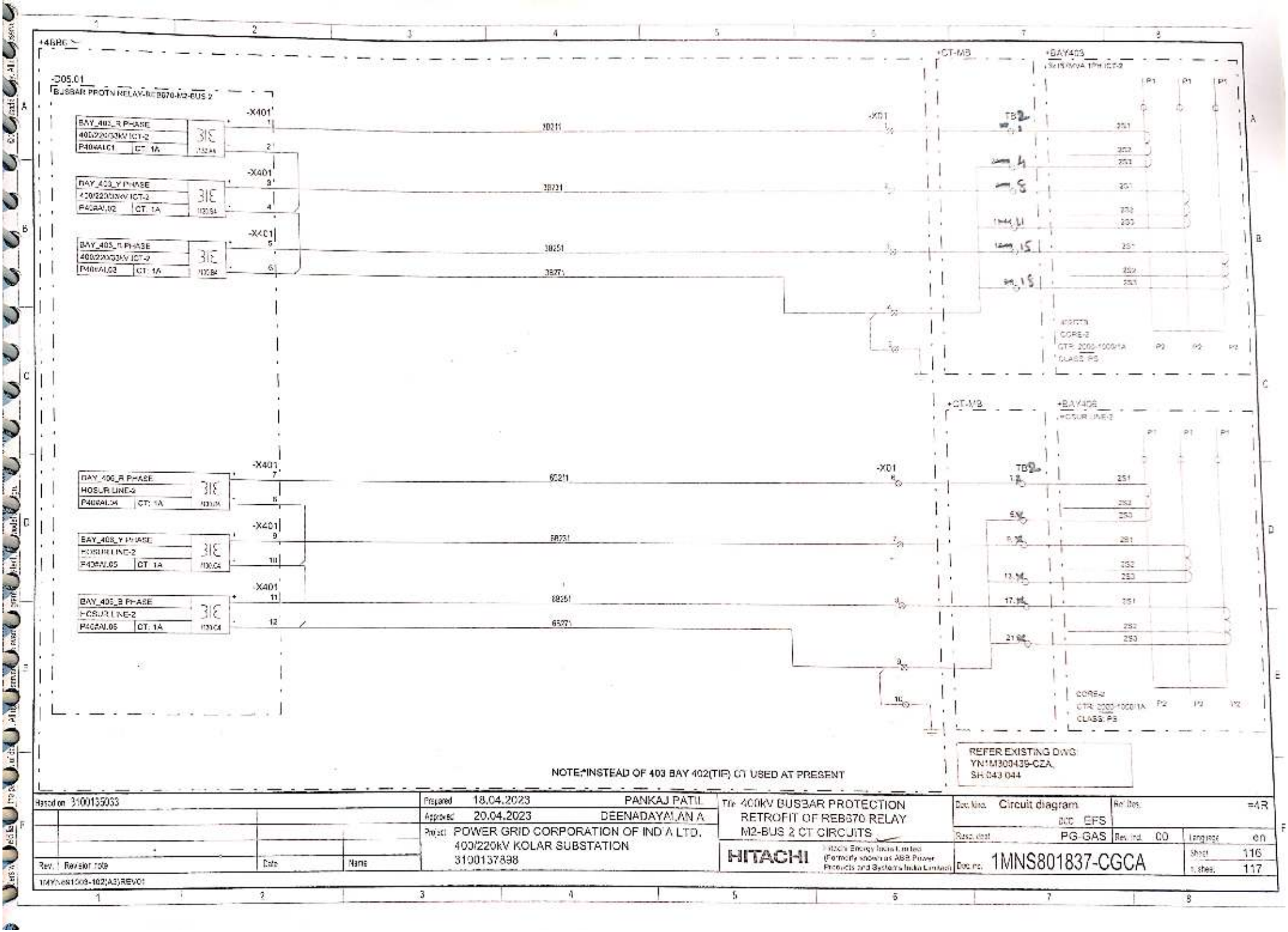
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 115
n. sheet 116

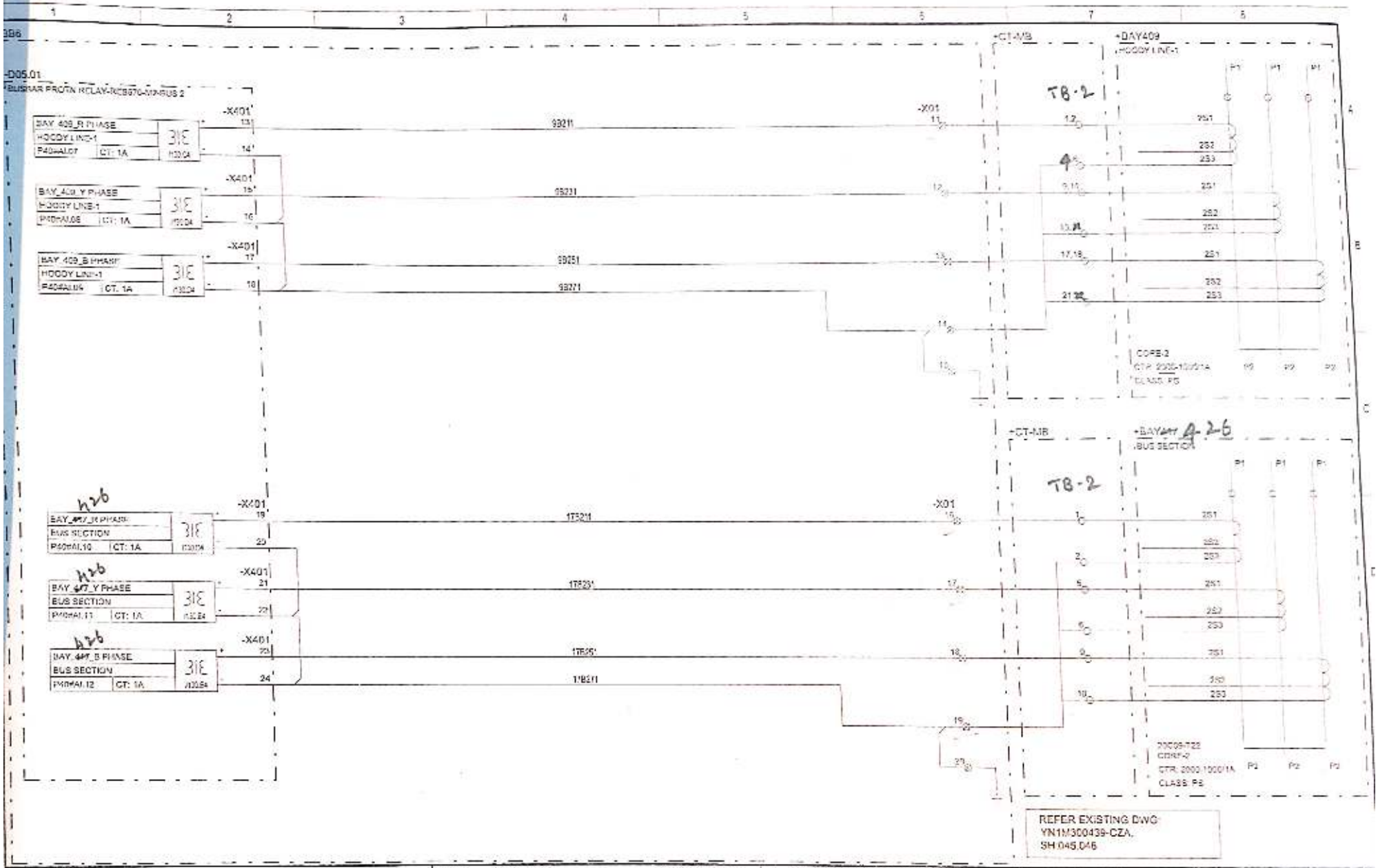
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135033		Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Ref Des.	=AR
		Approved 20.04.2023	DEENADAYALAN A		doc CFS		
		Project POWER GRID CORPORATION OF IND A LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp dept PG-GAS	Rev ind. 00	Language en
Rev. Revision note	Date	Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Sheet 116	
1MNS801509-102(A3)REV01						No. sheet 117	

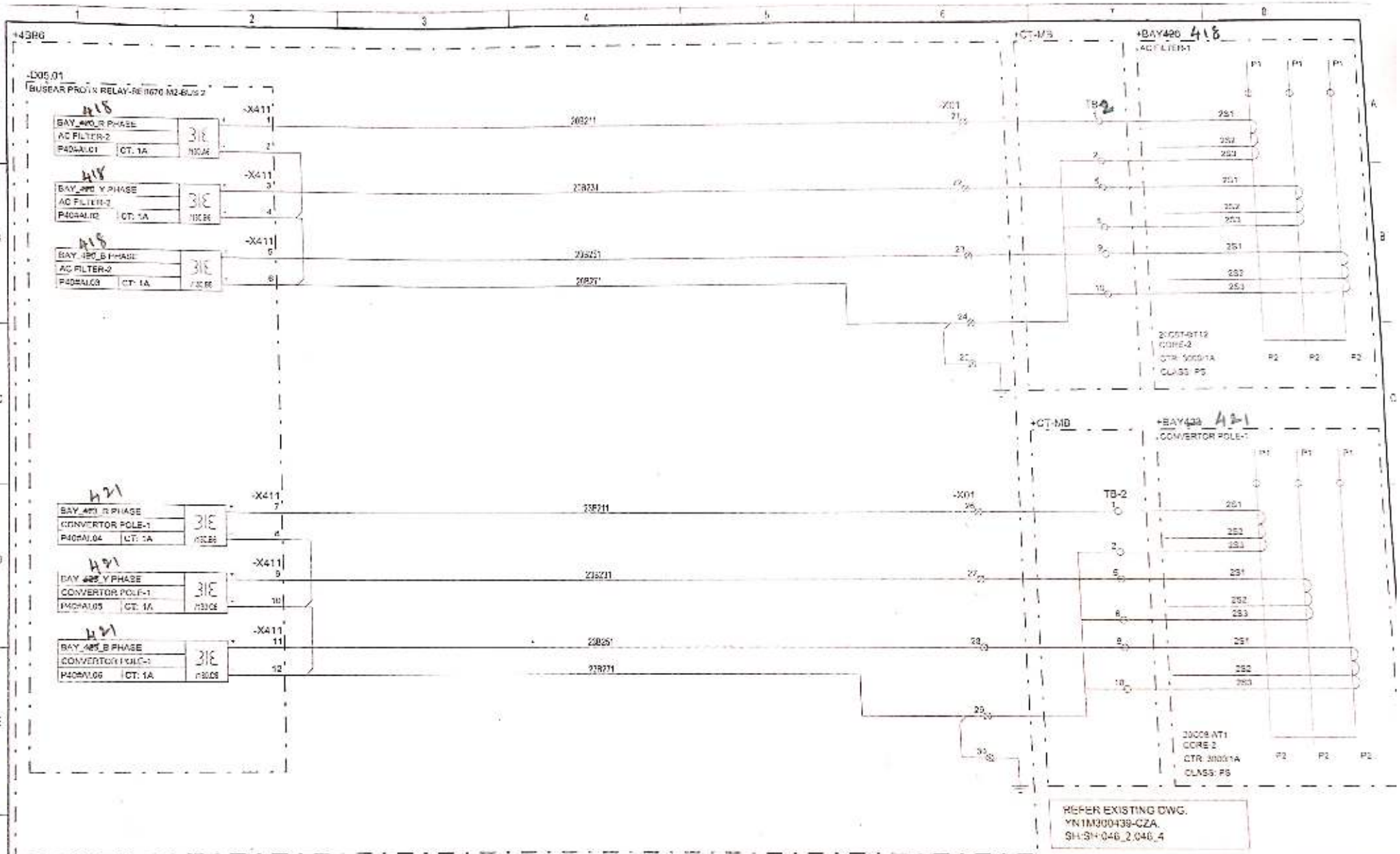
Scanned with OKEN Scanner



Based on: 3100135063	Prepared	18.04.2023	PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind: Circuit diagram	Ref Des.	=4R
	Approved	20.04.2023	DEENADAYALAN A		pcc: EFS		
	Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept: PG-GAS	Rev. ind: 00	Language: en
					Doc. no: 1MNS801837-CGCA	Sheet: 117	
Rev. Revision note	Date	Name				n. sheet: 118	

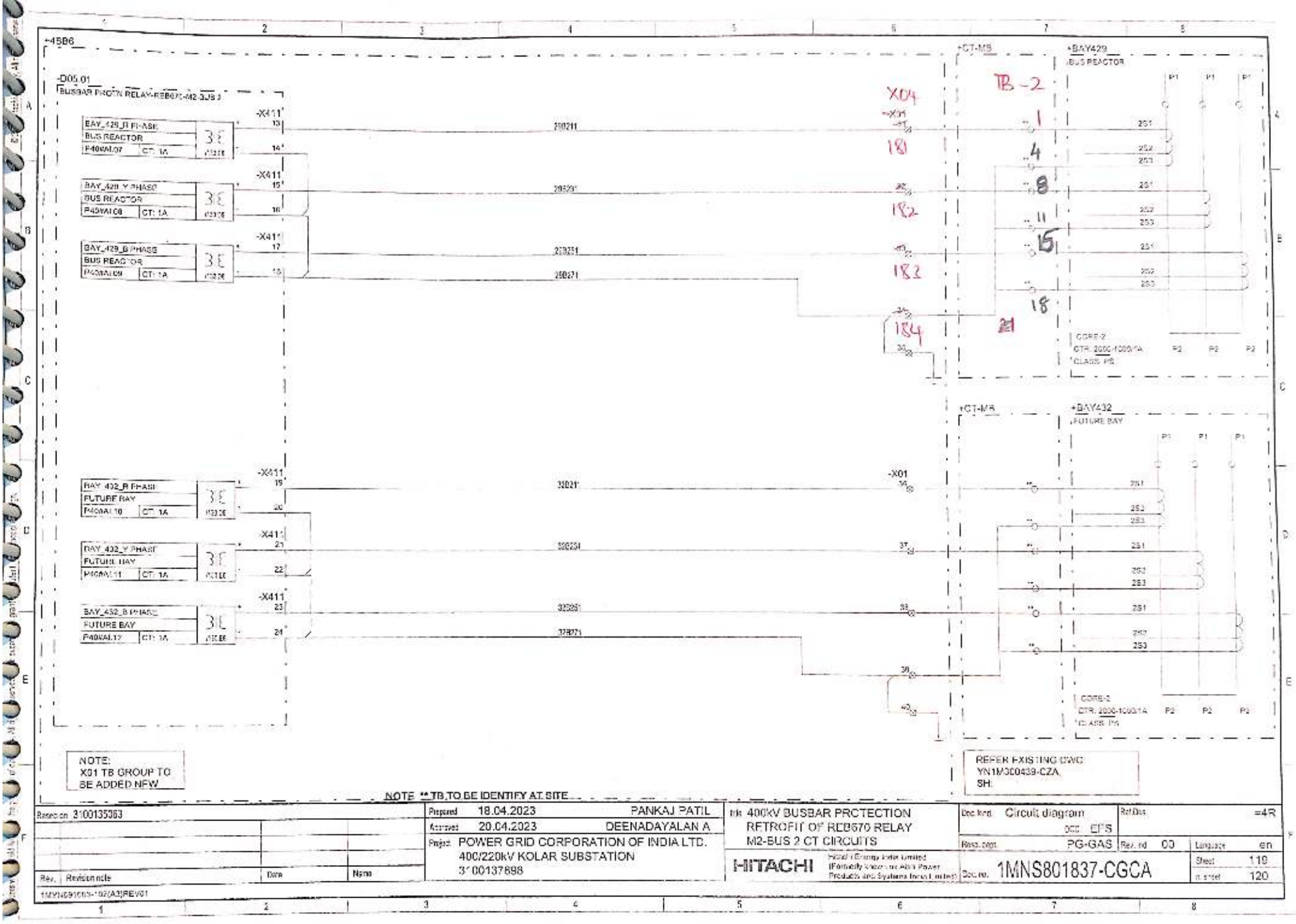
1MVN691003-102(A3)REV01

Scanned with OKEN Scanner



Based on 3100135063			Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	RefDes =4
			Approved 20.04.2023	DEENADAYALAN A		DOC EFS	
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00
Rev.	Revision note	Date	Name			Doc. no. 1MNS801837-CGCA	Language e Sheet 118 n. sheet 119
1MYN651003-102(A3)REV01							

Scanned with OKEN Scanner



Reason 2100135063	Prepared 18.04.2023 PANKAJ PATIL	400KV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Ref Doc	=4R
	Approved 20.04.2023 DEENADAYALAN A		DOC CTS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept PG-GAS	Rev. ind 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Sheet 119	
1MYN091063-192(A3)REV01				n sheet 120	

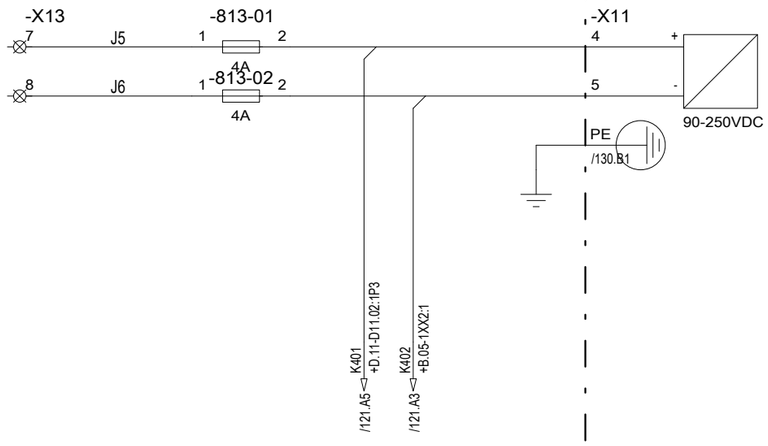
Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB6

FROM SH: 031/4

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2



+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
SFP

-X301

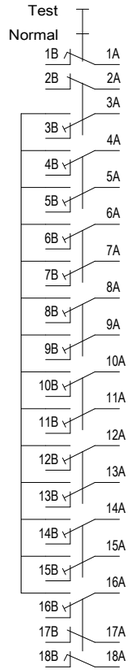
IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

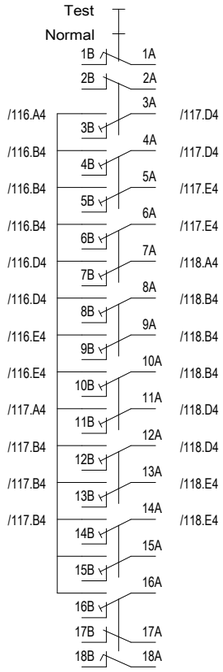
F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 048

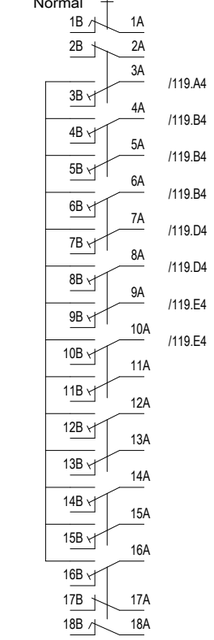
-D21.101.101



-D21.113.101



-D21.125.101



LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 120
n. sheet 121

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

-X31 1	MAIN 2 BUS 2 PROT IN	P3#BI.01	220-250VDC	/131.A2
-X31 2				
-X31 3	MAIN 2 BUS 2 PROT OUT	P3#BI.02	220-250VDC	/131.B2
-X31 4				
-X31 5	SPARE	P3#BI.03	220-250VDC	/131.B2
-X31 6				
-X31 7	TRIP RELAY RESET 96B BUS-2	P3#BI.04	220-250VDC	/131.B2
-X31 8				
-X31 9	SPARE	P3#BI.05	220-250VDC	/131.C2
-X31 10				
-X31 11	SPARE	P3#BI.06	220-250VDC	/131.C2
-X31 12				
-X31 13	SPARE	P3#BI.07	220-250VDC	/131.C2
-X31 14				
-X31 15	REB670 RELAY FAULTY BUS 2 - MAIN 1	P3#BI.08	220-250VDC	/131.D2
-X31 16				

-1XX2 1

+D.05-D05.01:5 (-X11) /120.B2 K402

+D.05-D05.01:4 (-X11) /120.B2 K401

K403 -D11.02 1P4 1P3 /121.B7 IN BB-2 M2 IN/OUT SWITCH

K404 -D11.02 1P2 /121.A7 OUT 1P1 BB-2 M2 IN/OUT SWITCH

K405 -6X04 1

K401 /171.B8

K406 /171.A5 +D.13-D13.101.101:221 -6X04 2

K407 3

K408 4

K409 5

K410 -X14A 3 -X14A 3 4 4

+4BB6

-D11.02
1P2 /121.B4
1P1 C 1P3
1P4 /121.B3
A
2P2
2P1 C 2P3
2P4
A
3P2
3P1 C 3P3
3P4
A
4P2
4P1 C 4P3
4P4
A
IN A
OUT C
BB-2 M2 IN/OUT SWITCH

+4BB2

+D.05 -X11
2
3
1
/58.B2
BUSBAR RELAY FAULTY
BUS-2 MAIN1

NOTE:
6X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

+B.05-1XX2:2 /122.A3 K402

+B.17-X04:13 /122.A5 K401

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

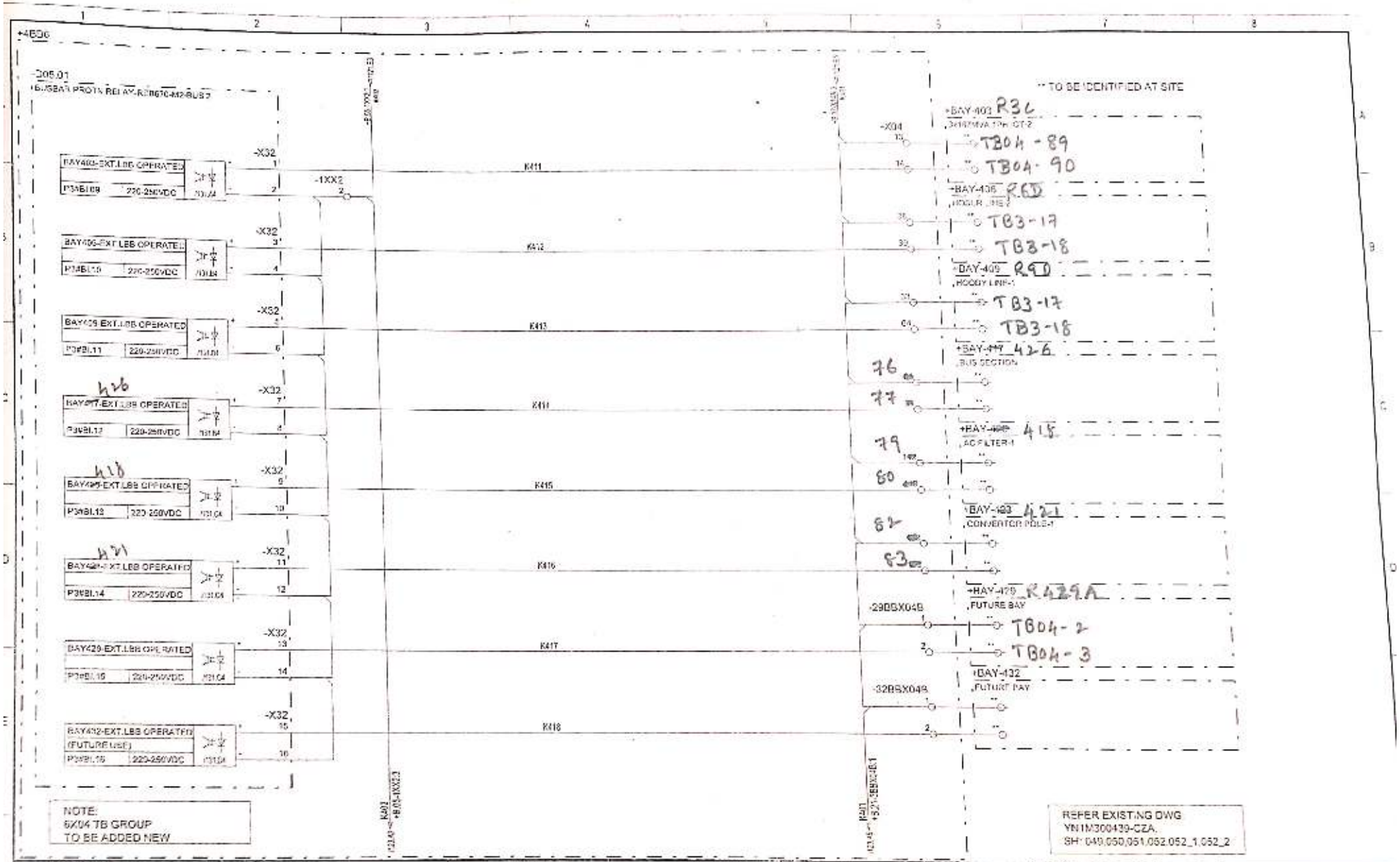
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 121
n. sheet 122
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01



Based on 3100135963	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS	Doc. kind Circuit diagram; 000 EFS; Ref.Des =4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev. no. 00; Language en
Rev. Revision note / Date / Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA; Sheet 122; n. sheet 123

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 /122.E3
+B.05-1XX2:2

K401 /122.E5
+B.33-32BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X51 1(+)	/133.A2
(FUTURE USE)			
P5#BI.01	220-250VDC	2(-)	
SPARE		-X51 3(+)	/133.B2
(FUTURE USE)			
P5#BI.02	220-250VDC	4(-)	
SPARE		-X51 5(+)	/133.B2
(FUTURE USE)			
P5#BI.03	220-250VDC	6(-)	
BAY-403 3PH LBB INIT.		-X51 7(+)	/133.B2
(FUTURE USE)			
P5#BI.04	220-250VDC	8(-)	
BAY-406 RPH LBB INIT.		-X51 9(+)	/133.C2
(FUTURE USE)			
P5#BI.05	220-250VDC	10(-)	
BAY-406 YPH LBB INIT.		-X51 11(+)	/133.C2
(FUTURE USE)			
P5#BI.06	220-250VDC	12(-)	
BAY-406 BPH LBB INIT.		-X51 13(+)	/133.C2
(FUTURE USE)			
P5#BI.07	220-250VDC	14(-)	
BAY-406 3PH LBB INIT.		-X51 15(+)	/133.D2
(FUTURE USE)			
P5#BI.08	220-250VDC	16(-)	

-1XX2 3

K419 K420 K421 K422 K423 K424 K425 K426

-3BBX04B
1 2 3 4 5

+BAY-403
3x167MVA 1PH ICT-2
REF.DRG.NO:####
SHT.NO:##
** ** ** ** ** ** ** **

-6BBX04B
1 2 3 4 5

+BAY-406
HOSUR LINE-2
REF.DRG.NO:####
SHT.NO:##
** ** ** ** ** ** ** **

NOTE:
3BBX04B,6BBX04B TB GROUP
TO BE ADDED NEW

K402 /124.A3
+B.05-1XX2:4

K401 /124.A5
+B.25-9BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 123
n. sheet 124

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 /123.E3
+B.05-1XX2:3

K401 /123.E5
+B.21-6BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-409 RPH LBB INIT.		-X52	+ 1	K427	-1XX2 4
(FUTURE USE)					
P5#BI.09	220-250VDC	/133.A4	- 2		
BAY-409 YPH LBB INIT.		-X52	+ 3	K428	
(FUTURE USE)					
P5#BI.10	220-250VDC	/133.B4	- 4		
BAY-409 BPH LBB INIT.		-X52	+ 5	K429	
(FUTURE USE)					
P5#BI.11	220-250VDC	/133.B4	- 6		
BAY-409 3PH LBB INIT.		-X52	+ 7	K430	
(FUTURE USE)					
P5#BI.12	220-250VDC	/133.B4	- 8		
SPARE		-X52	+ 9	K431	
P5#BI.13	220-250VDC	/133.C4	- 10		
SPARE		-X52	+ 11	K432	
P5#BI.14	220-250VDC	/133.C4	- 12		
SPARE		-X52	+ 13	K433	
P5#BI.15	220-250VDC	/133.C4	- 14		
BAY-417 3PH LBB INIT.		-X52	+ 15	K434	
(FUTURE USE)					
P5#BI.16	220-250VDC	/133.D4	- 16		

-9BBX04B
1 2 3 4 5 **

+BAY-409
HOODY LINE-1
REF.DRG.NO:####
SHT.NO:##

-17BBX04B
1 2 3 4 5 **

+BAY-417
BUS SECTION
REF.DRG.NO:####
SHT.NO:##

NOTE:
9BBX04B,17BBX04B TB GROUP
TO BE ADDED NEW

K402 /125.A3
+B.05-1XX2:5

K401 /125.A5
+B.29-20BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 124
n. sheet 125

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 /124.E3
+B.05-1XX2:4

K401 /124.E5
+B.25-17BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-420 RPH LBB INIT.		-X71 + 1	K435	-1XX2 5
(FUTURE USE)				
P7#BI.01	220-250VDC	- 2		/133.A6
BAY-420 YPH LBB INIT.		-X71 + 3	K436	
(FUTURE USE)				
P7#BI.02	220-250VDC	- 4		/133.B6
BAY-420 BPH LBB INIT.		-X71 + 5	K437	
(FUTURE USE)				
P7#BI.03	220-250VDC	- 6		/133.B6
BAY-420 3PH LBB INIT.		-X71 + 7	K438	
(FUTURE USE)				
P7#BI.04	220-250VDC	- 8		/133.B6
BAY-423 RPH LBB INIT.		-X71 + 9	K439	
(FUTURE USE)				
P7#BI.05	220-250VDC	- 10		/133.C6
BAY-423 YPH LBB INIT.		-X71 + 11	K440	
(FUTURE USE)				
P7#BI.06	220-250VDC	- 12		/133.C6
BAY-423 BPH LBB INIT.		-X71 + 13	K441	
(FUTURE USE)				
P7#BI.07	220-250VDC	- 14		/133.C6
BAY-423 3PH LBB INIT.		-X71 + 15	K442	
(FUTURE USE)				
P7#BI.08	220-250VDC	- 16		/133.D6

+BAY-420
AC FILTER-1
REF.DRG.NO:####
SHT.NO:##

-20BBX04B
1 **
2 **
3 **
4 **
5 **

+BAY-423
CONVERTOR POLE-1
REF.DRG.NO:####
SHT.NO:##

-23BBX04B
1 **
2 **
3 **
4 **
5 **

NOTE:
20BBX04B,23BBX04B TB GROUP
TO BE ADDED NEW

K402 /126.A3
+B.05-1XX2:6

K401 /126.A5
+B.33-29BBX04B:3

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 125
n. sheet 126

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 <I125.E3
+B.05-1XX2:5

K401 <I125.E5
+B.29-23BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-429 RPH LBB INIT.		-X72 + 1	K443
(FUTURE USE)		- 2	-1XX2 6
P7#BI.09	220-250VDC	/133.A7	
BAY-429 YPH LBB INIT.		-X72 + 3	K444
(FUTURE USE)		- 4	
P7#BI.10	220-250VDC	/133.B7	
BAY-429 BPH LBB INIT.		-X72 + 5	K445
(FUTURE USE)		- 6	
P7#BI.11	220-250VDC	/133.B7	
BAY-429 3PH LBB INIT.		-X72 + 7	K446
(FUTURE USE)		- 8	
P7#BI.12	220-250VDC	/133.B7	

-29BBX04B
3 4 5 6 7

+BAY-429
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##
** ** ** ** **

BAY-432 RPH LBB INIT.		-X72 + 9	K447
(FUTURE USE)		- 10	
P7#BI.13	220-250VDC	/133.C7	
BAY-432 YPH LBB INIT.		-X72 + 11	K448
(FUTURE USE)		- 12	
P7#BI.14	220-250VDC	/133.C7	
BAY-432 BPH LBB INIT.		-X72 + 13	K449
(FUTURE USE)		- 14	
P7#BI.15	220-250VDC	/133.C7	
BAY-432 3PH LBB INIT.		-X72 + 15	K450
(FUTURE USE)		- 16	
P7#BI.16	220-250VDC	/133.D7	

-32BBX04B
3 4 5 6 7

+BAY-432
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##
** ** ** ** **

NOTE:
29BBX04B,32BBX04B TB GROUP
TO BE ADDED NEW

K402 /128.A5 <I +B.17-X04:154

K401 /128.A5 <I +D.05-D05.01:2 (-X41)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

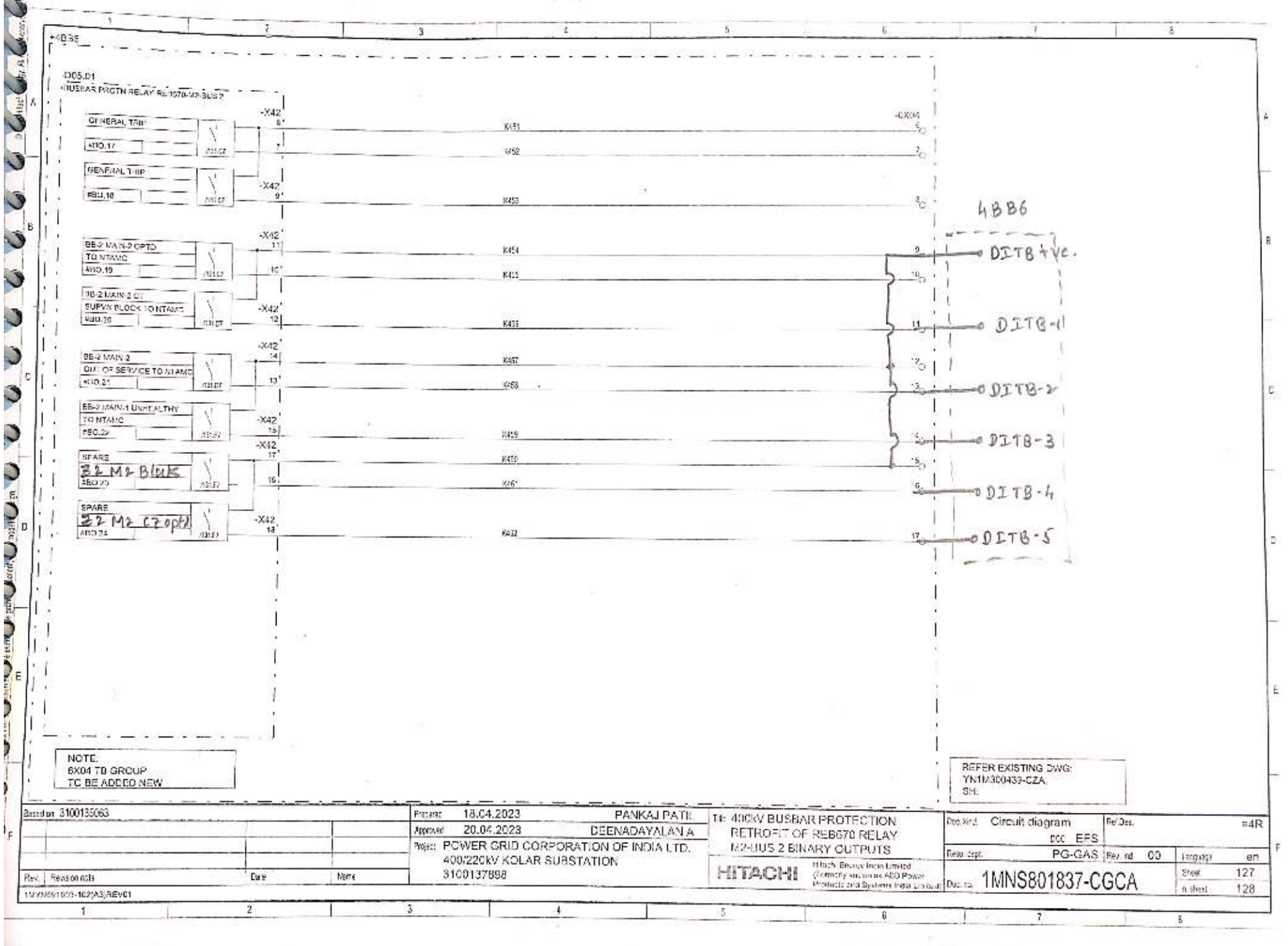
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

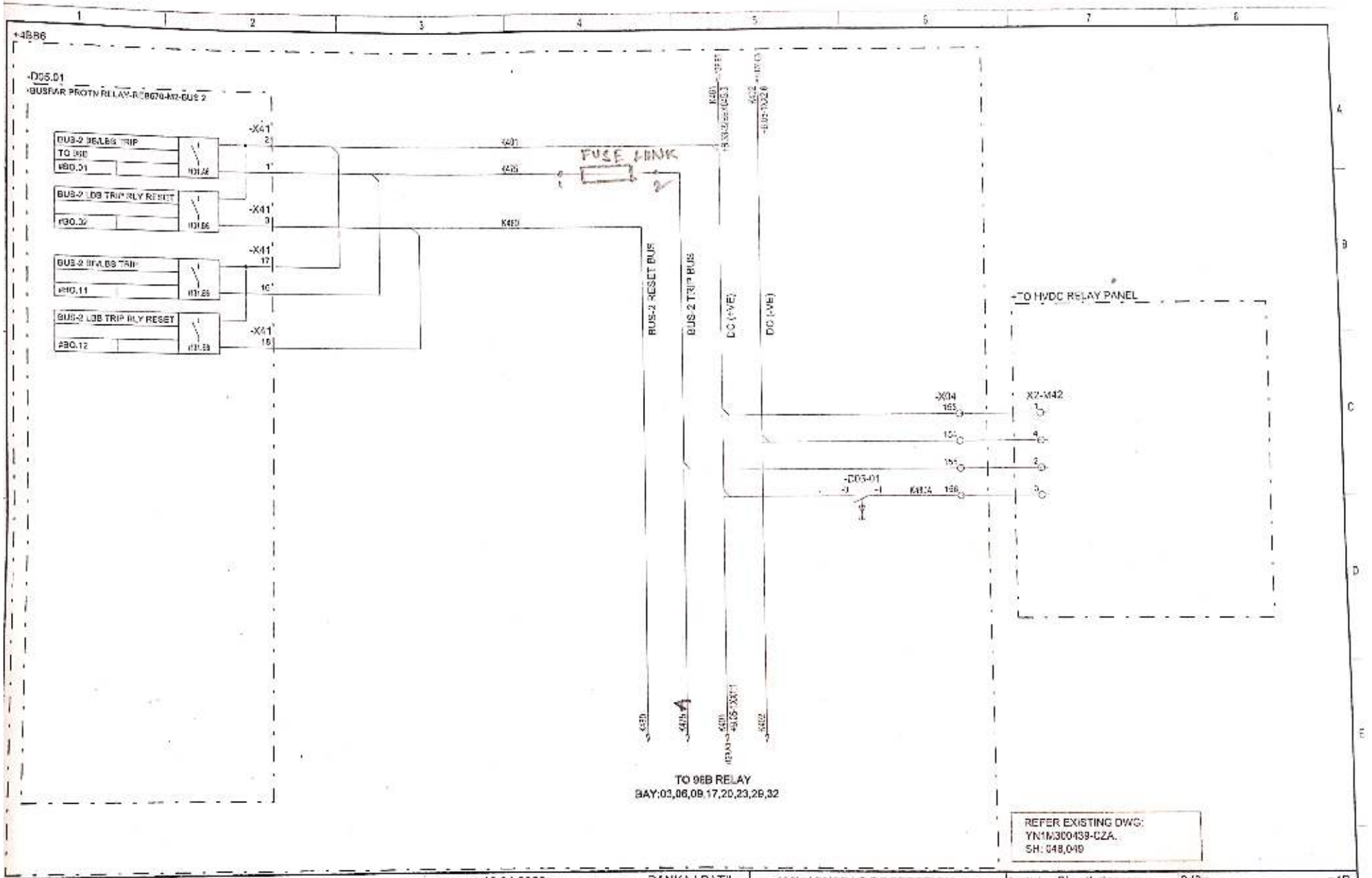
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 126
n. sheet 127

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Scanned with OKEN Scanner



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY OUTPUTS	Doc kind. Circuit diagram	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Reas cep. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note / Date / Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 128	n sheet 129

1MYN801039-1C2/ASI/REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K401 /128.E5
-D05-01:-3

BAY-403 LBB RETRIP-M2	#BO.03	/131.B6	-X41 5 4	6P13 19
BAY-406 RPH LBB RETRIP-M2	#BO.04	/131.C6	-X41 6	6P15 20
BAY-406 YPH LBB RETRIP-M2	#BO.05	/131.C6	-X41 8 7	6P17 21
BAY-406 BPH LBB RETRIP-M2	#BO.06	/131.C6	-X41 9	6P19 22
BAY-409 RPH LBB RETRIP-M2	#BO.07	/131.C6	-X41 11 10	6P21 23
BAY-409 YPH LBB RETRIP-M2	#BO.08	/131.D6	-X41 12	6P23 24
BAY-409 BPH LBB RETRIP-M2	#BO.09	/131.D6	-X41 14 13	6P25 25
BAY-417 LBB RETRIP-M2	#BO.10	/131.E6	-X41 15	6P27 26

-1XX1 1
-1XX1 2

-6X04

NOTE:
1XX1, 6X04 TB GROUP
TO BE ADDED NEW

K401 /129.A7
+B.05-1XX1:3

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K401 /129.E3
+B.05-1XX1:2

BAY-420 RPH LBB RETRIP-M2	#BO.01	/132.A2	-X61 2 1	6P29 27
BAY-420 YPH LBB RETRIP-M2	#BO.02	/132.B2	-X61 3	6P31 28
BAY-420 BPH LBB RETRIP-M2	#BO.03	/132.B2	-X61 5 4	6P33 29
BAY-423 RPH LBB RETRIP-M2	#BO.04	/132.C2	-X61 6	6P35 30
BAY-423 YPH LBB RETRIP-M2	#BO.05	/132.C2	-X61 8 7	6P37 31
BAY-423 BPH LBB RETRIP-M2	#BO.06	/132.C2	-X61 9	6P39 32
BAY-429 RPH LBB RETRIP-M2	#BO.07	/132.C2	-X61 11 10	6P41 33
BAY-429 YPH LBB RETRIP-M2	#BO.08	/132.D2	-X61 12	6P43 34
BAY-429 BPH LBB RETRIP-M2	#BO.09	/132.D2	-X61 14 13	6P45 35
BAY-432 RPH LBB RETRIP-M2	#BO.10	/132.E2	-X61 15	6P47 36
BAY-432 YPH LBB RETRIP-M2	#BO.11	/132.E2	-X61 17 16	6P49 37
BAY-432 BPH LBB RETRIP-M2	#BO.12	/132.E2	-X61 18	6P51 38

-1XX1 3
-1XX1 4
-1XX1 5

-6X04

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 129
n. sheet 130

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
PSM
90-250VDC

-X11

4 +
5 -
/120.B3
90-250VDC
PE

-X11
2
3 /49.E7
1

BB RELAY FAULTY	
BUS-2 MAIN-2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
TRM
1A, 50/60Hz

-X401

BAY_403_R PHASE	+ 1			
400/220/33kV ICT-2			- 2	/116.A2
P40#AI.01 CT: 1A				
BAY_403_Y PHASE	+ 3			
400/220/33kV ICT-2			- 4	/116.B2
P40#AI.02 CT: 1A				
BAY_403_B PHASE	+ 5			
400/220/33kV ICT-2			- 6	/116.B2
P40#AI.03 CT: 1A				
BAY_406_R PHASE	+ 7			
HOSUR LINE-2			- 8	/116.D2
P40#AI.04 CT: 1A				
BAY_406_Y PHASE	+ 9			
HOSUR LINE-2			- 10	/116.D2
P40#AI.05 CT: 1A				
BAY_406_B PHASE	+ 11			
HOSUR LINE-2			- 12	/116.E2
P40#AI.06 CT: 1A				
BAY_409_R PHASE	+ 13			
HOODY LINE-1			- 14	/117.A2
P40#AI.07 CT: 1A				
BAY_409_Y PHASE	+ 15			
HOODY LINE-1			- 16	/117.B2
P40#AI.08 CT: 1A				
BAY_409_B PHASE	+ 17			
HOODY LINE-1			- 18	/117.B2
P40#AI.09 CT: 1A				
BAY_417_R PHASE	+ 19			
BUS SECTION			- 20	/117.D2
P40#AI.10 CT: 1A				
BAY_417_Y PHASE	+ 21			
BUS SECTION			- 22	/117.D2
P40#AI.11 CT: 1A				
BAY_417_B PHASE	+ 23			
BUS SECTION			- 24	/117.E2
P40#AI.12 CT: 1A				

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
TRM
1A, 50/60Hz

-X411

BAY_420_R PHASE	+ 1			
AC FILTER-2			- 2	/118.A2
P40#AI.01 CT: 1A				
BAY_420_Y PHASE	+ 3			
AC FILTER-2			- 4	/118.B2
P40#AI.02 CT: 1A				
BAY_420_B PHASE	+ 5			
AC FILTER-2			- 6	/118.B2
P40#AI.03 CT: 1A				
BAY_423_R PHASE	+ 7			
CONVERTOR POLE-1			- 8	/118.D2
P40#AI.04 CT: 1A				
BAY_423_Y PHASE	+ 9			
CONVERTOR POLE-1			- 10	/118.D2
P40#AI.05 CT: 1A				
BAY_423_B PHASE	+ 11			
CONVERTOR POLE-1			- 12	/118.E2
P40#AI.06 CT: 1A				
BAY_429_R PHASE	+ 13			
BUS REACTOR			- 14	/119.A2
P40#AI.07 CT: 1A				
BAY_429_Y PHASE	+ 15			
BUS REACTOR			- 16	/119.B2
P40#AI.08 CT: 1A				
BAY_429_B PHASE	+ 17			
BUS REACTOR			- 18	/119.B2
P40#AI.09 CT: 1A				
BAY_432_R PHASE	+ 19			
FUTURE BAY			- 20	/119.D2
P40#AI.10 CT: 1A				
BAY_432_Y PHASE	+ 21			
FUTURE BAY			- 22	/119.D2
P40#AI.11 CT: 1A				
BAY_432_B PHASE	+ 23			
FUTURE BAY			- 24	/119.E2
P40#AI.12 CT: 1A				

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 130
n. sheet 131

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X31

MAIN 2 BUS 2 PROT IN	P3#BI.01	220-250VDC	+ 1 / - 2	/121.B2
MAIN 2 BUS 2 PROT OUT	P3#BI.02	220-250VDC	+ 3 / - 4	/121.B2
SPARE	P3#BI.03	220-250VDC	+ 5 / - 6	/121.C2
TRIP RELAY RESET 96B BUS-2	P3#BI.04	220-250VDC	+ 7 / - 8	/121.C2
SPARE	P3#BI.05	220-250VDC	+ 9 / - 10	/121.C2
SPARE	P3#BI.06	220-250VDC	+ 11 / - 12	/121.D2
SPARE	P3#BI.07	220-250VDC	+ 13 / - 14	/121.D2
REB670 RELAY FAULTY BUS 2 - MAIN 1	P3#BI.08	220-250VDC	+ 15 / - 16	/121.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X32

BAY403-EXT.LBB OPERATED	P3#BI.09	220-250VDC	+ 1 / - 2	/122.B2
BAY406-EXT.LBB OPERATED	P3#BI.10	220-250VDC	+ 3 / - 4	/122.B2
BAY409-EXT.LBB OPERATED	P3#BI.11	220-250VDC	+ 5 / - 6	/122.C2
BAY417-EXT.LBB OPERATED	P3#BI.12	220-250VDC	+ 7 / - 8	/122.C2
BAY420-EXT.LBB OPERATED	P3#BI.13	220-250VDC	+ 9 / - 10	/122.D2
BAY423-EXT.LBB OPERATED	P3#BI.14	220-250VDC	+ 11 / - 12	/122.D2
BAY429-EXT.LBB OPERATED	P3#BI.15	220-250VDC	+ 13 / - 14	/122.E2
BAY432-EXT.LBB OPERATED (FUTURE USE)	P3#BI.16	220-250VDC	+ 15 / - 16	/122.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

-X41

BUS-2 BB/LBB TRIP TO 96B	#BO.01	2 / 1	/128.B2
BUS-2 LBB TRIP RLY RESET	#BO.02	3	/128.B2
BAY-403 LBB RETRIP-M2	#BO.03	5 / 4	/129.B2
BAY-406 RPH LBB RETRIP-M2	#BO.04	6	/129.B2
BAY-406 YPH LBB RETRIP-M2	#BO.05	8 / 7	/129.B2
BAY-406 BPH LBB RETRIP-M2	#BO.06	9	/129.C2
BAY-409 RPH LBB RETRIP-M2	#BO.07	11 / 10	/129.C2
BAY-409 YPH LBB RETRIP-M2	#BO.08	12	/129.C2
BAY-409 BPH LBB RETRIP-M2	#BO.09	14 / 13	/129.D2
BAY-417 LBB RETRIP-M2	#BO.10	15	/129.D2
BUS-2 BB/LBB TRIP	#BO.11	17 / 16	/128.B2
BUS-2 LBB TRIP RLY RESET	#BO.12	18	/128.C2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

-X42

BUSBAR-2 OPTD ANNUNCIATION CKT	#BO.13	2 / 1	/173.A3
BB-2 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.B3
BUSBAR-2 Rph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.A6
BUSBAR-2 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.B6
GENERAL TRIP	#BO.17	8 / 7	/127.A2
GENERAL TRIP	#BO.18	9	/127.B2
BB-2 MAIN-2 OPTD TO NTAMC	#BO.19	11 / 10	/127.B2
BB-2 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/127.C2
BB-2 MAIN-2 OUT OF SERVICE TO NTAMC	#BO.21	14 / 13	/127.C2
BB-2 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/127.C2
SPARE	#BO.23	17 / 16	/127.D2
SPARE	#BO.24	18	/127.D2

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Resp. dept. PG-GAS
Doc. no. 1MNS801837-CGCA

Ref.Des. =4R
Rev. ind. 01
Language en
Sheet 131
n. sheet 132

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

-X61

BAY-420 RPH LBB RETRIP-M2	#BO.01	2 / 1	/129.B6
BAY-420 YPH LBB RETRIP-M2	#BO.02	3	/129.B6
BAY-420 BPH LBB RETRIP-M2	#BO.03	5 / 4	/129.B6
BAY-423 RPH LBB RETRIP-M2	#BO.04	6	/129.C6
BAY-423 YPH LBB RETRIP-M2	#BO.05	8 / 7	/129.C6
BAY-423 BPH LBB RETRIP-M2	#BO.06	9	/129.C6
BAY-429 RPH LBB RETRIP-M2	#BO.07	11 / 10	/129.D6
BAY-429 YPH LBB RETRIP-M2	#BO.08	12	/129.D6
BAY-429 BPH LBB RETRIP-M2	#BO.09	14 / 13	/129.D6
BAY-432 RPH LBB RETRIP-M2	#BO.10	15	/129.E6
BAY-432 YPH LBB RETRIP-M2	#BO.11	17 / 16	/129.E6
BAY-432 BPH LBB RETRIP-M2	#BO.12	18	/129.E6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

X62

BUSBAR-2 Bph OPTD EVENT LOGGER CKT	#BO.13	2 / 1	/175.B6
BB-2 CT SUPVN EVENT LOGGER CKT	#BO.14	3	/175.B6
SPARE	#BO.15	5 / 4	
SPARE	#BO.16	6	
SPARE	#BO.17	8 / 7	
SPARE	#BO.18	9	
SPARE	#BO.19	11 / 10	
SPARE	#BO.20	12	
SPARE	#BO.21	14 / 13	
SPARE	#BO.22	15	
SPARE	#BO.23	17 / 16	
SPARE	#BO.24	18	

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 132
n. sheet 133

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X51

SPARE (FUTURE USE) P5#BI.01 220-250VDC	+ 1	- 2	/123.B2
SPARE (FUTURE USE) P5#BI.02 220-250VDC	+ 3	- 4	/123.B2
SPARE (FUTURE USE) P5#BI.03 220-250VDC	+ 5	- 6	/123.C2
BAY-403 3PH LBB INIT. (FUTURE USE) P5#BI.04 220-250VDC	+ 7	- 8	/123.C2
BAY-406 RPH LBB INIT. (FUTURE USE) P5#BI.05 220-250VDC	+ 9	- 10	/123.D2
BAY-406 YPH LBB INIT. (FUTURE USE) P5#BI.06 220-250VDC	+ 11	- 12	/123.D2
BAY-406 BPH LBB INIT. (FUTURE USE) P5#BI.07 220-250VDC	+ 13	- 14	/123.E2
BAY-406 3PH LBB INIT. (FUTURE USE) P5#BI.08 220-250VDC	+ 15	- 16	/123.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X52

BAY-409 RPH LBB INIT. (FUTURE USE) P5#BI.09 220-250VDC	+ 1	- 2	/124.B2
BAY-409 YPH LBB INIT. (FUTURE USE) P5#BI.10 220-250VDC	+ 3	- 4	/124.B2
BAY-409 BPH LBB INIT. (FUTURE USE) P5#BI.11 220-250VDC	+ 5	- 6	/124.C2
BAY-409 3PH LBB INIT. (FUTURE USE) P5#BI.12 220-250VDC	+ 7	- 8	/124.C2
SPARE P5#BI.13 220-250VDC	+ 9	- 10	/124.D2
SPARE P5#BI.14 220-250VDC	+ 11	- 12	/124.D2
SPARE P5#BI.15 220-250VDC	+ 13	- 14	/124.E2
BAY-417 3PH LBB INIT. (FUTURE USE) P5#BI.16 220-250VDC	+ 15	- 16	/124.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X71

BAY-420 RPH LBB INIT. (FUTURE USE) P7#BI.01 220-250VDC	+ 1	- 2	/125.B2
BAY-420 YPH LBB INIT. (FUTURE USE) P7#BI.02 220-250VDC	+ 3	- 4	/125.B2
BAY-420 BPH LBB INIT. (FUTURE USE) P7#BI.03 220-250VDC	+ 5	- 6	/125.C2
BAY-420 3PH LBB INIT. (FUTURE USE) P7#BI.04 220-250VDC	+ 7	- 8	/125.C2
BAY-423 RPH LBB INIT. (FUTURE USE) P7#BI.05 220-250VDC	+ 9	- 10	/125.D2
BAY-423 YPH LBB INIT. (FUTURE USE) P7#BI.06 220-250VDC	+ 11	- 12	/125.D2
BAY-423 BPH LBB INIT. (FUTURE USE) P7#BI.07 220-250VDC	+ 13	- 14	/125.E2
BAY-423 3PH LBB INIT. (FUTURE USE) P7#BI.08 220-250VDC	+ 15	- 16	/125.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X72

BAY-429 RPH LBB INIT. (FUTURE USE) P7#BI.09 220-250VDC	+ 1	- 2	/126.B2
BAY-429 YPH LBB INIT. (FUTURE USE) P7#BI.10 220-250VDC	+ 3	- 4	/126.B2
BAY-429 BPH LBB INIT. (FUTURE USE) P7#BI.11 220-250VDC	+ 5	- 6	/126.C2
BAY-429 3PH LBB INIT. (FUTURE USE) P7#BI.12 220-250VDC	+ 7	- 8	/126.C2
BAY-432 RPH LBB INIT. (FUTURE USE) P7#BI.13 220-250VDC	+ 9	- 10	/126.D2
BAY-432 YPH LBB INIT. (FUTURE USE) P7#BI.14 220-250VDC	+ 11	- 12	/126.D2
BAY-432 BPH LBB INIT. (FUTURE USE) P7#BI.15 220-250VDC	+ 13	- 14	/126.E2
BAY-432 3PH LBB INIT. (FUTURE USE) P7#BI.16 220-250VDC	+ 15	- 16	/126.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

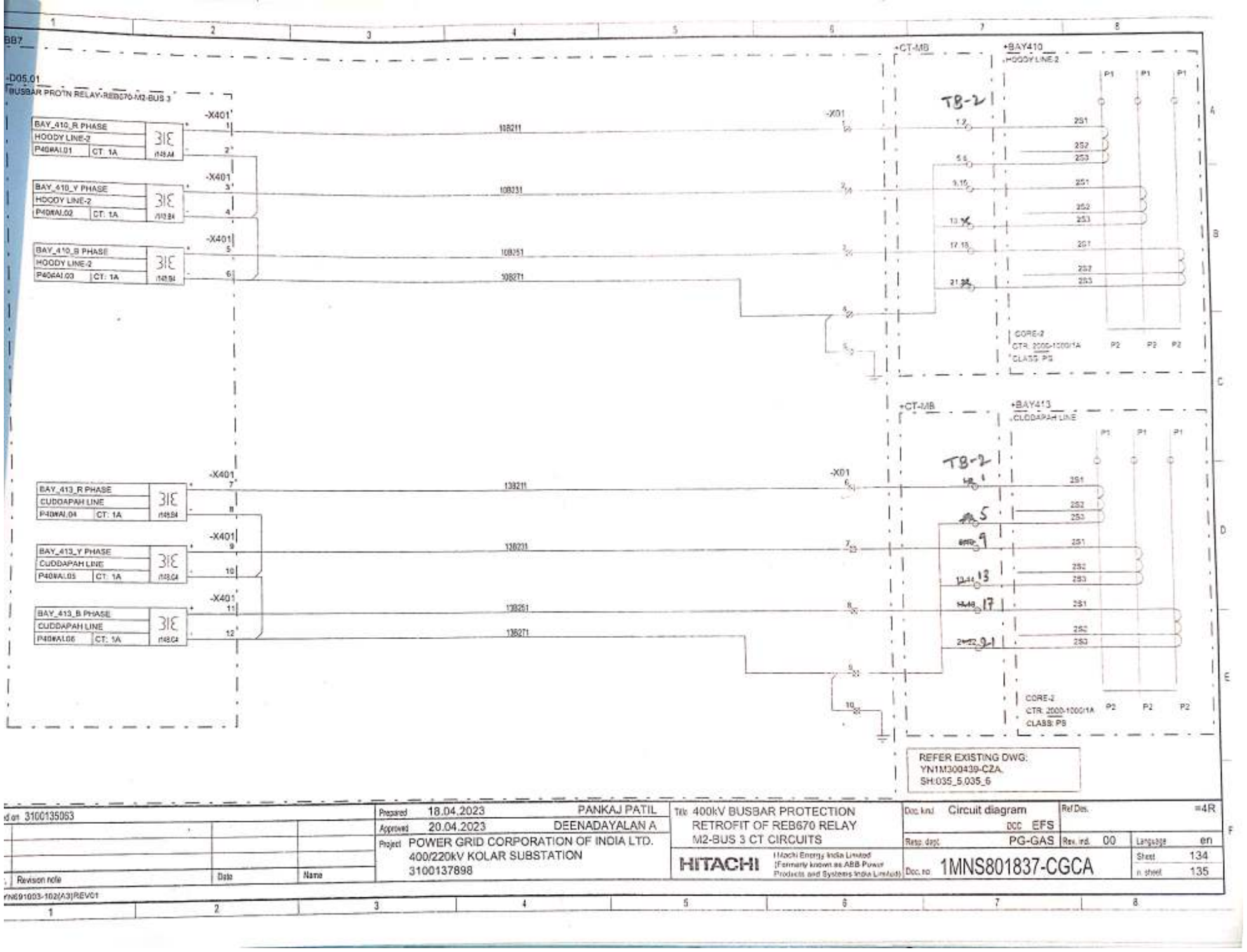
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

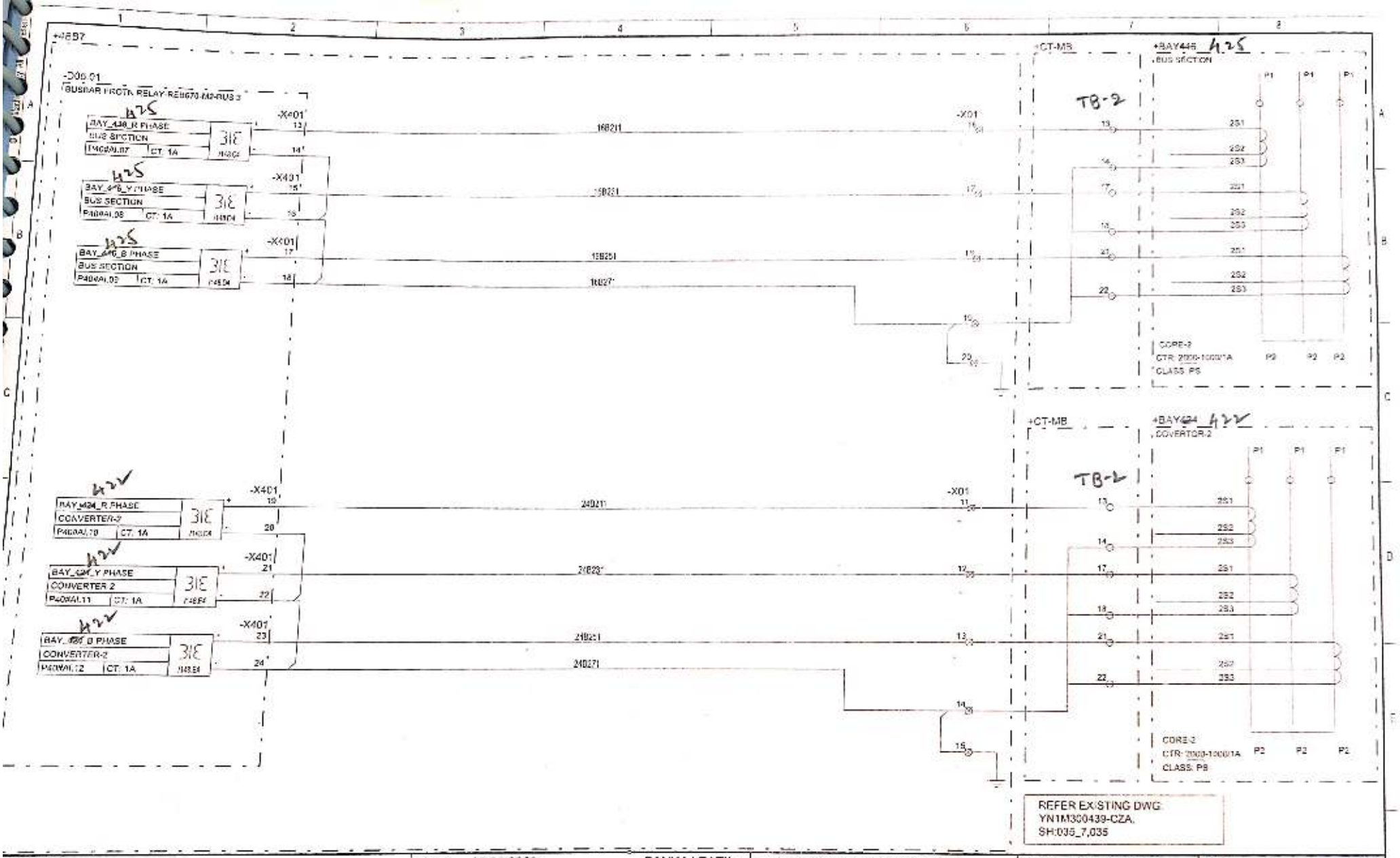
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 133
n. sheet 134

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Scanned with OKEN Scanner



3100135363			Prepared	18.04.2023	PANKAJ PATIL	Doc. kind: Circuit diagram	Ref.Des. =4R
			Approved	20.04.2023	DEENADAYALAN A	DOC EFS	
			Project:	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00 Language en
Revision note	Date	Name				Doc. no. 1MNS801837-CGCA	Sheet 135 n. sheet 136

Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 CT CIRCUITS

HITACHI — Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)

003-102(A3)/REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY_433_R PHASE			
FUTURE BAY			
P40#AI.01	CT: 1A		/148.A6

BAY_433_Y PHASE			
FUTURE BAY			
P40#AI.02	CT: 1A		/148.B6

BAY_433_B PHASE			
FUTURE BAY			
P40#AI.03	CT: 1A		/148.B6

-X401: + 1, - 2 | 33B212
-X401: + 3, - 4 | 33B232
-X401: + 5, - 6 | 33B252 | 33B272

-D21.113.101
7A 33B211 /138.B8 — 7B
8A 33B231 /138.B8 — 8B
9A 33B251 /138.B8 — 9B
10A 33B271 /138.B8 — 10B

** -X01
21, 22, 23, 24, 25

+CT-MB

+BAY433
FUTURE BAY
P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

+CT-MB

+BAY436
FUTURE BAY
P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

BAY_436_R PHASE			
FUTURE BAY			
P40#AI.04	CT: 1A		/148.B6

BAY_436_Y PHASE			
FUTURE BAY			
P40#AI.05	CT: 1A		/148.C6

BAY_436_B PHASE			
FUTURE BAY			
P40#AI.06	CT: 1A		/148.C6

-X401: + 7, - 8 | 36B212
-X401: + 9, - 10 | 36B232
-X401: + 11, - 12 | 36B252 | 36B272

-D21.113.101
11A 36B211 /138.B8 — 11B
12A 36B231 /138.B8 — 12B
13A 36B251 /138.C8 — 13B
14A 36B271 /138.C8 — 14B

** -X01
26, 27, 28, 29, 30

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 3 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 136
n. sheet 137

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY_439_R PHASE			
FUTURE BAY			
P40#AI.07	CT: 1A		/148.C6

BAY_439_Y PHASE			
FUTURE BAY			
P40#AI.08	CT: 1A		/148.D6

BAY_439_B PHASE			
FUTURE BAY			
P40#AI.09	CT: 1A		/148.D6

-X401: + 13, - 14 | 39B212 | -D21.125.101: 3B, 3A /138.D8 | 39B211 | **-X01: 31
-X401: + 15, - 16 | 39B232 | 4B, 4A /138.D8 | 39B231 | 32
-X401: + 17, - 18 | 39B252 | 5B, 5A /138.D8 | 39B251 | 33
39B272 | 6B, 6A /138.D8 | 39B271 | 34
35

+CT-MB

+BAY439
FUTURE BAY

P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
P2 P2 P2

CORE-2
CTR: 2000-1000/1A
CLASS: PS

BAY_442_R PHASE			
FUTURE BAY			
P40#AI.10	CT: 1A		/148.D6

BAY_442_Y PHASE			
FUTURE BAY			
P40#AI.11	CT: 1A		/148.E6

BAY_442_B PHASE			
FUTURE BAY			
P40#AI.12	CT: 1A		/148.E6

-X401: + 19, - 20 | 42B212 | -D21.125.101: 7B, 7A /138.D8 | 42B211 | ** -X01: 36
-X401: + 21, - 22 | 42B232 | 8B, 8A /138.D8 | 42B231 | 37
-X401: + 23, - 24 | 42B252 | 9B, 9A /138.D8 | 42B251 | 38
42B272 | 10B, 10A /138.E8 | 42B271 | 39
40

+CT-MB

+BAY442
FUTURE BAY

P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
P2 P2 P2

CORE-2
CTR: 2000-1000/1A
CLASS: PS

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 137
n. sheet 138

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB7

FROM SH: 031/2

-X13 -B13-01 -B13-02

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

PSM
-X11

90-250VDC

PE
/148.B1

K601 +D.23-D23.02:1P3
/139.A5

K602 +B.09-1XX2:1
/139.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.101.101
Test
Normal

1B	1A	
2B	2A	
3B	3A	/134.A4
4B	4A	/134.B4
5B	5A	/134.B4
6B	6A	/134.B4
7B	7A	/134.D4
8B	8A	/134.D4
9B	9A	/134.E4
10B	10A	/134.E4
11B	11A	/135.A4
12B	12A	/135.B4
13B	13A	/135.B4
14B	14A	/135.B4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.113.101
Test
Normal

1B	1A	
2B	2A	
3B	3A	/135.D4
4B	4A	/135.D4
5B	5A	/135.E4
6B	6A	/135.E4
7B	7A	/136.A4
8B	8A	/136.B4
9B	9A	/136.B4
10B	10A	/136.B4
11B	11A	/136.D4
12B	12A	/136.D4
13B	13A	/136.E4
14B	14A	/136.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.125.101
Test
Normal

1B	1A	
2B	2A	
3B	3A	/137.A4
4B	4A	/137.B4
5B	5A	/137.B4
6B	6A	/137.B4
7B	7A	/137.D4
8B	8A	/137.D4
9B	9A	/137.E4
10B	10A	/137.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 037

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 138
n. sheet 139

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

+D.05-D05.01:5 (-X11) /138.B2 K602

+D.05-D05.01:4 (-X11) /138.B2 K601

-X31 1	MAIN 2 BUS 3PROT IN	P3#BI.01	220-250VDC	/149.A2	-1XX2 1
-X31 3	MAIN 2 BUS 3 PROT OUT	P3#BI.02	220-250VDC	/149.B2	
-X31 5	SPARE	P3#BI.03	220-250VDC	/149.B2	
-X31 7	TRIP RELAY RESET 96B BUS -3	P3#BI.04	220-250VDC	/149.B2	
-X31 9	SPARE	P3#BI.05	220-250VDC	/149.C2	
-X31 11	SPARE	P3#BI.06	220-250VDC	/149.C2	
-X31 13	SPARE	P3#BI.07	220-250VDC	/149.C2	
-X31 15	REB670 RELAY FAULTY BUS 3 - MAIN 1	P3#BI.08	220-250VDC	/149.D2	

-D23.02
1P3 — 1P4 — K603 — /139.B7 IN — BB-3 M2 IN/OUT SWITCH

-D23.02
1P2 — /139.A7 OUT — 1P1 — K604 — BB-3 M2 IN/OUT SWITCH

K605 → -7X04 2

K601 → /171.E4

K606 → /171.D1 → +D.13-D13.101.101:221

-7X04 3

K607 → 4

K608 → 5

K609 → 6

K610 → -X14A 3 / -X14A 4

-D23.02
1P2 /139.B4, 1P1 C, 1P3 1P4 /139.B3 A
2P2 2P1 C, 2P3 2P4 A
3P2 3P1 C, 3P3 3P4 A
4P2 4P1 C, 4P3 4P4 A
IN A, OUT C
BB-3 M2 IN/OUT SWITCH

+4BB3

+D.05
-X14A 3 — -X14A 3 — -X11 2
4 — 3
1
/76.B2
BUSBAR RELAY FAULTY
BUS-3 MAIN-1

NOTE:
7X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

+B.09-1XX2:2 /140.A3 K602

+B.33-X04:13 /140.A5 K601

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

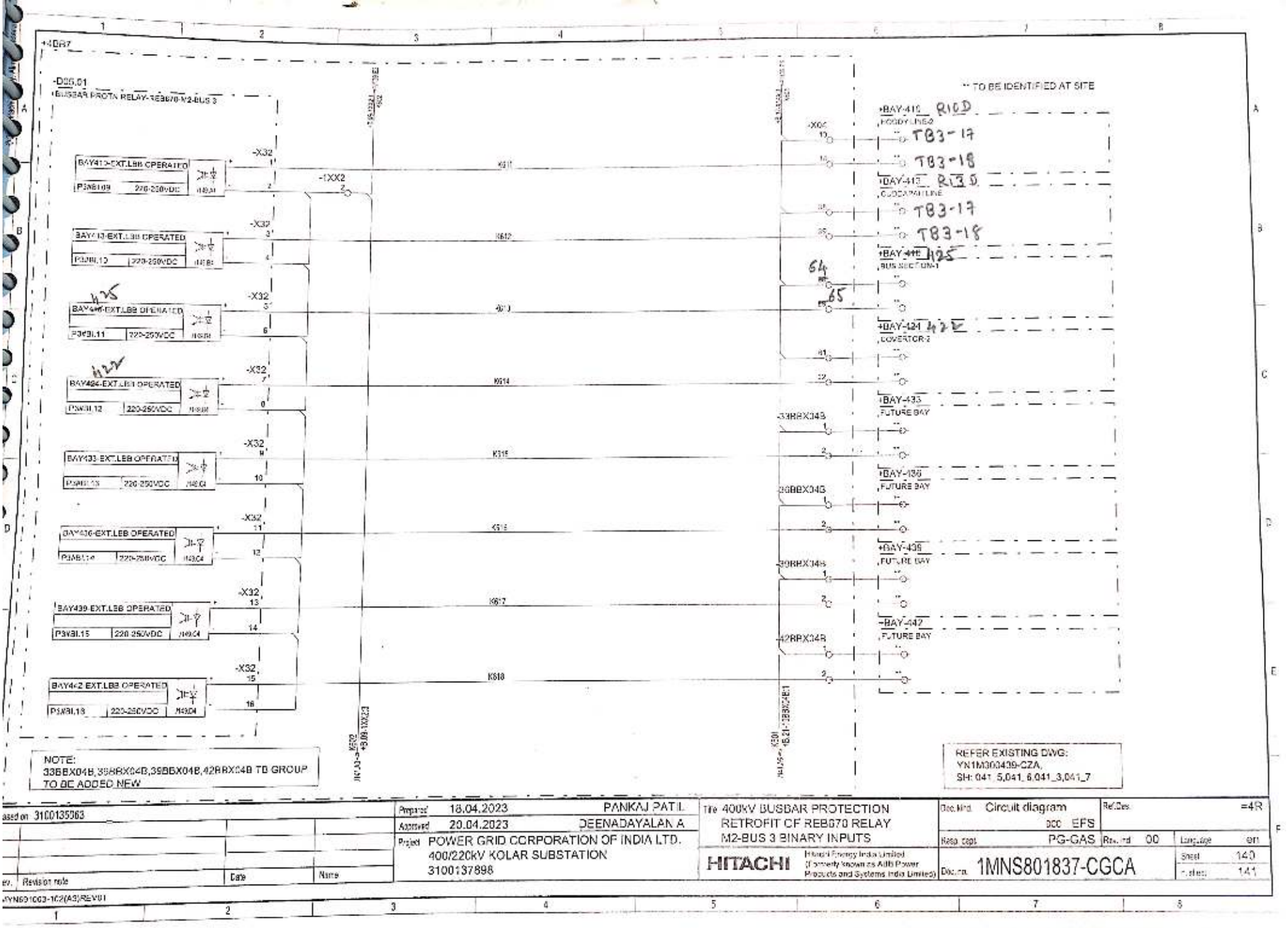
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 139
n. sheet 140

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Prepared	18.04.2023	PANKAJ PATIL	The 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS	Doc.kind Circuit diagram	Ref.Des =4R
Approved	20.04.2023	DEENADAYALAN A		doc EFS	
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp.dept PG-GAS	Rev.ind 00 Language en
				Doc.no 1MNS801837-CGCA	Sheet 140 Sheets 141

based on 3100135063

Rev.	Revision note	Date	Name

YN601003-1C2(AS)REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /140.E3
+B.09-1XX2:2

K601 /140.E5
+B.33-42BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-410
HOODY LINE-2
REF.DRG.NO:####
SHT.NO:##

-10BBX04B

+BAY-413
CUDDAPAH LINE
REF.DRG.NO:####
SHT.NO:##

-13BBX04B

BAY-410 RPH LBB INIT.		-X51 + 1	K619	-1XX2 3	1 2 ** **
(FUTURE USE)					
P5#BI.01	220-250VDC	- 2 /151.A2			
BAY-410 YPH LBB INIT.		-X51 + 3	K620		3 **
(FUTURE USE)					
P5#BI.02	220-250VDC	- 4 /151.B2			
BAY-410 BPH LBB INIT.		-X51 + 5	K621		4 **
(FUTURE USE)					
P5#BI.03	220-250VDC	- 6 /151.B2			
BAY-410 3PH LBB INIT.		-X51 + 7	K622		5 **
(FUTURE USE)					
P5#BI.04	220-250VDC	- 8 /151.B2			
BAY-413 RPH LBB INIT.		-X51 + 9	K623		1 **
(FUTURE USE)					
P5#BI.05	220-250VDC	- 10 /151.C2			2 **
BAY-413 YPH LBB INIT.		-X51 + 11	K624		3 **
(FUTURE USE)					
P5#BI.06	220-250VDC	- 12 /151.C2			
BAY-413 BPH LBB INIT.		-X51 + 13	K625		4 **
(FUTURE USE)					
P5#BI.07	220-250VDC	- 14 /151.C2			
BAY-413 3PH LBB INIT.		-X51 + 15	K626		5 **
(FUTURE USE)					
P5#BI.08	220-250VDC	- 16 /151.D2			

K602 /142.A3
+B.09-1XX2:4

K601 /142.A6
+B.25-16BBX04B:1

NOTE:
10BBX04B,13BBX04B TB GROUP TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 141
n. sheet 142

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /141.E3
+B.09-1XX2:3

K601 /141.E6
+B.21-13BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-416
BUS SECTION-1
REF.DRG.NO:####
SHT.NO:##

-16BBX04B

+BAY-424
COVERTOR-2
REF.DRG.NO:####
SHT.NO:##

-24BBX04B

SPARE	-X52 + 1	K627	-1XX2 4	-16BBX04B 1	**
(FUTURE USE)	- 2			2	**
P5#BI.09 220-250VDC /151.A4					
SPARE	-X52 + 3	K628		3	**
(FUTURE USE)	- 4				
P5#BI.10 220-250VDC /151.B4					
SPARE	-X52 + 5	K629		4	**
(FUTURE USE)	- 6				
P5#BI.11 220-250VDC /151.B4					
BAY-416 3PH LBB INIT.	-X52 + 7	K630		5	**
(FUTURE USE)	- 8				
P5#BI.12 220-250VDC /151.B4					
BAY-424 RPH LBB INIT.	-X52 + 9	K631		-24BBX04B 1	**
(FUTURE USE)	- 10			2	**
P5#BI.13 220-250VDC /151.C4					
BAY-424 YPH LBB INIT.	-X52 + 11	K632		3	**
(FUTURE USE)	- 12				
P5#BI.14 220-250VDC /151.C4					
BAY-424 BPH LBB INIT.	-X52 + 13	K633		4	**
(FUTURE USE)	- 14				
P5#BI.15 220-250VDC /151.C4					
BAY-424 3PH LBB INIT.	-X52 + 15	K634		5	**
(FUTURE USE)	- 16				
P5#BI.16 220-250VDC /151.D4					

K602 /143.A3 +B.09-1XX2:5

K601 /143.A6 +B.29-33BBX04B:3

NOTE:
16BBX04B,24BBX04B TB GROUP TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 142
n. sheet 143

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /142.E3
+B.09-1XX2:4

K601 /142.E6
+B.25-24BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-433 RPH LBB INIT.		-X71 + 1	K635
(FUTURE USE)			
P7#BI.01	220-250VDC	/151.A6 - 2	-1XX2 5
BAY-433 YPH LBB INIT.		-X71 + 3	K636
(FUTURE USE)			
P7#BI.02	220-250VDC	/151.B6 - 4	
BAY-433 BPH LBB INIT.		-X71 + 5	K637
(FUTURE USE)			
P7#BI.03	220-250VDC	/151.B6 - 6	
BAY-433 3PH LBB INIT.		-X71 + 7	K638
(FUTURE USE)			
P7#BI.04	220-250VDC	/151.B6 - 8	
BAY-436 RPH LBB INIT.		-X71 + 9	K639
(FUTURE USE)			
P7#BI.05	220-250VDC	/151.C6 - 10	
BAY-436 YPH LBB INIT.		-X71 + 11	K640
(FUTURE USE)			
P7#BI.06	220-250VDC	/151.C6 - 12	
BAY-436 BPH LBB INIT.		-X71 + 13	K641
(FUTURE USE)			
P7#BI.07	220-250VDC	/151.C6 - 14	
BAY-436 3PH LBB INIT.		-X71 + 15	K642
(FUTURE USE)			
P7#BI.08	220-250VDC	/151.D6 - 16	

+BAY-433
FUTURE BAY
-33BBX04B
REF.DRG.NO:####
SHT.NO:##

+BAY-436
FUTURE BAY
-36BBX04B
REF.DRG.NO:####
SHT.NO:##

NOTE:
33BBX04B,36BBX04B TB GROUP
TO BE ADDED NEW

K602 /144.A3
+B.09-1XX2:6

K601 /144.A6
+B.33-39BBX04B:3

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 143
n. sheet 144

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /143.E3
+B.09-1XX2:5

K601 /143.E6
+B.29-36BBX04B:3

** TO BE IDENTIFIED AT SITE

BAY-439 RPH LBB INIT.		-X72 + 1	K643
(FUTURE USE)		-1XX2 6	
P7#BI.09	220-250VDC	/151.A7 - 2	
BAY-439 YPH LBB INIT.		-X72 + 3	K644
(FUTURE USE)			
P7#BI.10	220-250VDC	/151.B7 - 4	
BAY-439 BPH LBB INIT.		-X72 + 5	K645
(FUTURE USE)			
P7#BI.11	220-250VDC	/151.B7 - 6	
BAY-439 3PH LBB INIT.		-X72 + 7	K646
(FUTURE USE)			
P7#BI.12	220-250VDC	/151.B7 - 8	

-39BBX04B
3 4 5 6 7

+BAY-439
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

BAY-442 RPH LBB INIT.		-X72 + 9	K647
(FUTURE USE)			
P7#BI.13	220-250VDC	/151.C7 - 10	
BAY-442 YPH LBB INIT.		-X72 + 11	K648
(FUTURE USE)			
P7#BI.14	220-250VDC	/151.C7 - 12	
BAY-442 BPH LBB INIT.		-X72 + 13	K649
(FUTURE USE)			
P7#BI.15	220-250VDC	/151.C7 - 14	
BAY-442 3PH LBB INIT.		-X72 + 15	K650
(FUTURE USE)			
P7#BI.16	220-250VDC	/151.D7 - 16	

-42BBX04B
3 4 5 6 7

+BAY-442
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

K602 /146.A5
+B.33-X04:154

K601 /146.A5
+D.05-D05.01:2 (-X41)

NOTE:
39BBX04B,42BBX04B TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

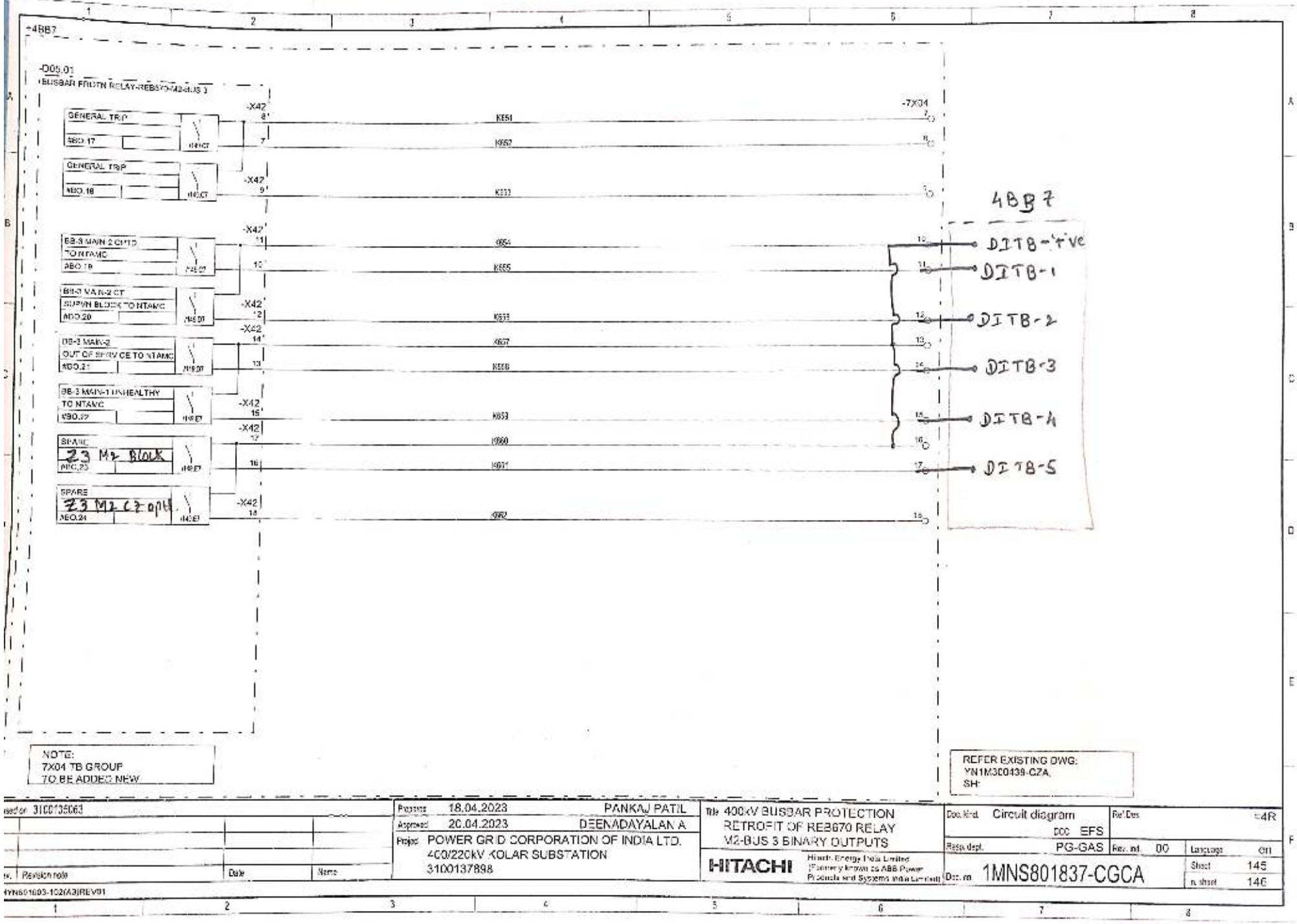
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 144
n. sheet 145

1MYN691003-102(A3)REV01

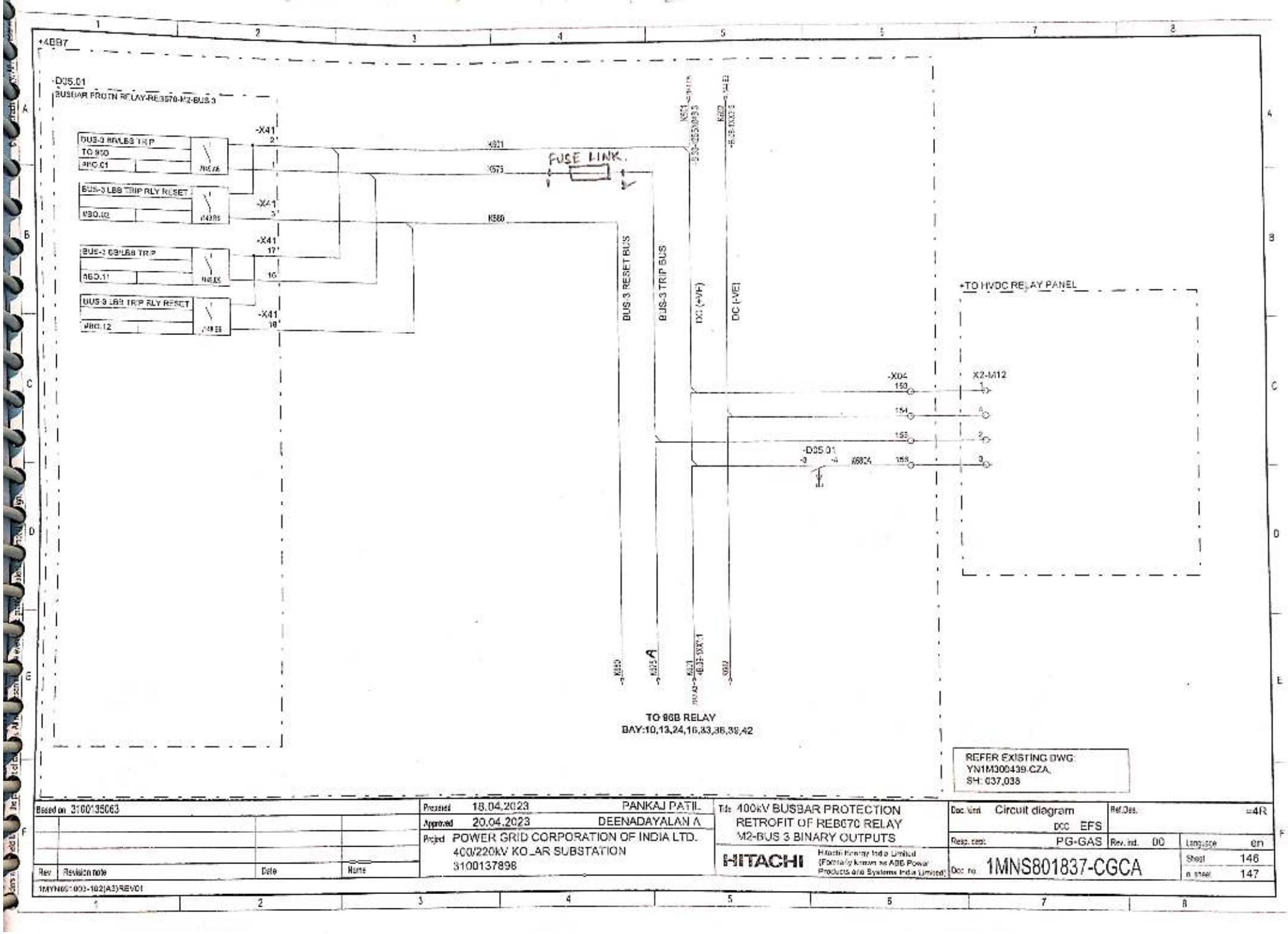
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Prepared	18.04.2023	PANKAJ PATIL	
Approved	20.04.2023	DEENADAYALAN A	
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		
Title	400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY OUTPUTS		
Doc. kind	Circuit diagram	Ref Des	=4R
	DOC EFS		
Resp dept	PG-GAS	Rev. ind. 00	Language en
Doc. no	1MNS801837-CGCA	Sheet	145
		n. sheet	146

HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY-410 RPH LBB RETRIP-M2	#BO.03	/149.B6	-X41 5 / 4	-1XX1 1	7P13
BAY-410 YPH LBB RETRIP-M2	#BO.04	/149.C6	-X41 6		7P15
BAY-410 BPH LBB RETRIP-M2	#BO.05	/149.C6	-X41 8 / 7		7P17
BAY-413 RPH LBB RETRIP-M2	#BO.06	/149.C6	-X41 9		7P19
BAY-413 YPH LBB RETRIP-M2	#BO.07	/149.C6	-X41 11 / 10	-1XX1 2	7P21
BAY-413 BPH LBB RETRIP-M2	#BO.08	/149.D6	-X41 12		7P23
BAY-424 RPH LBB RETRIP-M2	#BO.09	/149.D6	-X41 14 / 13		7P25
BAY-424 YPH LBB RETRIP-M2	#BO.10	/149.E6	-X41 15		7P27
BAY-424 BPH LBB RETRIP-M2	#BO.01	/150.A2	-X61 2 / 1	-1XX1 3	7P29
BAY-416 LBB RETRIP-M2	#BO.02	/150.B2	-X61 3		7P31
BAY-433 RPH LBB RETRIP-M2	#BO.03	/150.B2	-X61 5 / 4		7P33
BAY-433 YPH LBB RETRIP-M2	#BO.04	/150.B2	-X61 6		7P35

K601 /146.E5 +D.05-D05.01:-3

K601 /147.A6 +B.09-1XX1:4

-7X04 20 21 22 23 24 25 26 27 28 29 30 31

NOTE:
1XX1, 7X04 TB GROUP
TO BE ADDED NEW

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY-433 BPH LBB RETRIP-M2	#BO.05	/150.C2	-X61 8 / 7	-1XX1 4	7P37
BAY-436 RPH LBB RETRIP-M2	#BO.06	/150.C2	-X61 9		7P39
BAY-436 YPH LBB RETRIP-M2	#BO.07	/150.C2	-X61 11 / 10		7P41
BAY-436 BPH LBB RETRIP-M2	#BO.08	/150.D2	-X61 12		7P43
BAY-439 RPH LBB RETRIP-M2	#BO.09	/150.D2	-X61 14 / 13	-1XX1 5	7P45
BAY-439 YPH LBB RETRIP-M2	#BO.10	/150.D2	-X61 15		7P47
BAY-439 BPH LBB RETRIP-M2	#BO.11	/150.E2	-X61 17 / 16		7P49
BAY-442 RPH LBB RETRIP-M2	#BO.12	/150.E2	-X61 18		7P51
BAY-442 YPH LBB RETRIP-M2	#BO.13	/150.A4	-X62 2 / 1	-1XX1 6	7P53
BAY-442 BPH LBB RETRIP-M2	#BO.14	/150.B4	-X62 3		7P55

K601 /147.E3 +B.09-1XX1:3

-7X04 32 33 34 35 36 37 38 39 40 41

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 147
n. sheet 148

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
PSM
90-250VDC

-X11

4 +
5 -
/138.B3
90-250VDC
PE

-X11
2
3 /67.E7
1

BUSBAR RELAY FAULTY
BUS-3 MAIN-2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
TRM
1A, 50/60Hz

-X401

BAY_410_R PHASE HOODY LINE-2 P40#AI.01 CT: 1A	+ 1 - 2	/134.A2	BAY_433_R PHASE FUTURE BAY P40#AI.01 CT: 1A	+ 1 - 2	/136.A2
BAY_410_Y PHASE HOODY LINE-2 P40#AI.02 CT: 1A	+ 3 - 4	/134.B2	BAY_433_Y PHASE FUTURE BAY P40#AI.02 CT: 1A	+ 3 - 4	/136.B2
BAY_410_B PHASE HOODY LINE-2 P40#AI.03 CT: 1A	+ 5 - 6	/134.B2	BAY_433_B PHASE FUTURE BAY P40#AI.03 CT: 1A	+ 5 - 6	/136.B2
BAY_413_R PHASE CUDDAPAH LINE P40#AI.04 CT: 1A	+ 7 - 8	/134.D2	BAY_436_R PHASE FUTURE BAY P40#AI.04 CT: 1A	+ 7 - 8	/136.D2
BAY_413_Y PHASE CUDDAPAH LINE P40#AI.05 CT: 1A	+ 9 - 10	/134.D2	BAY_436_Y PHASE FUTURE BAY P40#AI.05 CT: 1A	+ 9 - 10	/136.D2
BAY_413_B PHASE CUDDAPAH LINE P40#AI.06 CT: 1A	+ 11 - 12	/134.E2	BAY_436_B PHASE FUTURE BAY P40#AI.06 CT: 1A	+ 11 - 12	/136.E2
BAY_416_R PHASE BUS SECTION P40#AI.07 CT: 1A	+ 13 - 14	/135.A2	BAY_439_R PHASE FUTURE BAY P40#AI.07 CT: 1A	+ 13 - 14	/137.A2
BAY_416_Y PHASE BUS SECTION P40#AI.08 CT: 1A	+ 15 - 16	/135.B2	BAY_439_Y PHASE FUTURE BAY P40#AI.08 CT: 1A	+ 15 - 16	/137.B2
BAY_416_B PHASE BUS SECTION P40#AI.09 CT: 1A	+ 17 - 18	/135.B2	BAY_439_B PHASE FUTURE BAY P40#AI.09 CT: 1A	+ 17 - 18	/137.B2
BAY_424_R PHASE CONVERTER-2 P40#AI.10 CT: 1A	+ 19 - 20	/135.D2	BAY_442_R PHASE FUTURE BAY P40#AI.10 CT: 1A	+ 19 - 20	/137.D2
BAY_424_Y PHASE CONVERTER-2 P40#AI.11 CT: 1A	+ 21 - 22	/135.D2	BAY_442_Y PHASE FUTURE BAY P40#AI.11 CT: 1A	+ 21 - 22	/137.D2
BAY_424_B PHASE CONVERTER-2 P40#AI.12 CT: 1A	+ 23 - 24	/135.E2	BAY_442_B PHASE FUTURE BAY P40#AI.12 CT: 1A	+ 23 - 24	/137.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 148
n. sheet 149

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X31

MAIN 2 BUS 3PROT IN	P3#BI.01	220-250VDC	+ 1 / - 2	/139.B2
MAIN 2 BUS 3 PROT OUT	P3#BI.02	220-250VDC	+ 3 / - 4	/139.B2
SPARE	P3#BI.03	220-250VDC	+ 5 / - 6	/139.C2
TRIP RELAY RESET 96B BUS -3	P3#BI.04	220-250VDC	+ 7 / - 8	/139.C2
SPARE	P3#BI.05	220-250VDC	+ 9 / - 10	/139.C2
SPARE	P3#BI.06	220-250VDC	+ 11 / - 12	/139.D2
SPARE	P3#BI.07	220-250VDC	+ 13 / - 14	/139.D2
REB670 RELAY FAULTY BUS 3 - MAIN 1	P3#BI.08	220-250VDC	+ 15 / - 16	/139.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X32

BAY410-EXT.LBB OPERATED	P3#BI.09	220-250VDC	+ 1 / - 2	/140.B2
BAY413-EXT.LBB OPERATED	P3#BI.10	220-250VDC	+ 3 / - 4	/140.B2
BAY416-EXT.LBB OPERATED	P3#BI.11	220-250VDC	+ 5 / - 6	/140.C2
BAY424-EXT.LBB OPERATED	P3#BI.12	220-250VDC	+ 7 / - 8	/140.C2
BAY433-EXT.LBB OPERATED	P3#BI.13	220-250VDC	+ 9 / - 10	/140.D2
BAY436-EXT.LBB OPERATED	P3#BI.14	220-250VDC	+ 11 / - 12	/140.D2
BAY439-EXT.LBB OPERATED	P3#BI.15	220-250VDC	+ 13 / - 14	/140.E2
BAY442-EXT.LBB OPERATED	P3#BI.16	220-250VDC	+ 15 / - 16	/140.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X41

BUS-3 BB/LBB TRIP TO 96B	#BO.01	2 / 1	/146.B2
BUS-3 LBB TRIP RLY RESET	#BO.02	3	/146.B2
BAY-410 RPH LBB RETRIP-M2	#BO.03	5 / 4	/147.B2
BAY-410 YPH LBB RETRIP-M2	#BO.04	6	/147.B2
BAY-410 BPH LBB RETRIP-M2	#BO.05	8 / 7	/147.B2
BAY-413 RPH LBB RETRIP-M2	#BO.06	9	/147.C2
BAY-413 YPH LBB RETRIP-M2	#BO.07	11 / 10	/147.C2
BAY-413 BPH LBB RETRIP-M2	#BO.08	12	/147.C2
BAY-424 RPH LBB RETRIP-M2	#BO.09	14 / 13	/147.D2
BAY-424 YPH LBB RETRIP-M2	#BO.10	15	/147.D2
BUS-3 BB/LBB TRIP	#BO.11	17 / 16	/146.B2
BUS-3 LBB TRIP RLY RESET	#BO.12	18	/146.C2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X42

BUSBAR-3 OPTD ANNUNCIATION CKT	#BO.13	2 / 1	/173.E5
BB-3 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.E5
BUSBAR-3 Rph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.D2
BUSBAR-3 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.E2
GENERAL TRIP	#BO.17	8 / 7	/145.A2
GENERAL TRIP	#BO.18	9	/145.B2
BB-3 MAIN-2 OPTD TO NTAMC	#BO.19	11 / 10	/145.B2
BB-3 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/145.C2
BB-3 MAIN-2 OUT OF SERVICE TO NTAMC	#BO.21	14 / 13	/145.C2
BB-3 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/145.C2
SPARE	#BO.23	17 / 16	/145.D2
SPARE	#BO.24	18	/145.D2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Resp. dept. PG-GAS
Doc. no. 1MNS801837-CGCA

Ref.Des. =4R
Rev. ind. 01
Language en
Sheet 149
n. sheet 150

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X61

BAY-424 BPH LBB RETRIP-M2	#BO.01	2 / 1	/147.D2
BAY-416 LBB RETRIP-M2	#BO.02	3	/147.E2
BAY-433 RPH LBB RETRIP-M2	#BO.03	5 / 4	/147.E2
BAY-433 YPH LBB RETRIP-M2	#BO.04	6	/147.E2
BAY-433 BPH LBB RETRIP-M2	#BO.05	8 / 7	/147.B5
BAY-436 RPH LBB RETRIP-M2	#BO.06	9	/147.B5
BAY-436 YPH LBB RETRIP-M2	#BO.07	11 / 10	/147.B5
BAY-436 BPH LBB RETRIP-M2	#BO.08	12	/147.C5
BAY-439 RPH LBB RETRIP-M2	#BO.09	14 / 13	/147.C5
BAY-439 YPH LBB RETRIP-M2	#BO.10	15	/147.C5
BAY-439 BPH LBB RETRIP-M2	#BO.11	17 / 16	/147.D5
BAY-442 RPH LBB RETRIP-M2	#BO.12	18	/147.D5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X62

BAY-442 YPH LBB RETRIP-M2	#BO.13	2 / 1	/147.D5
BAY-442 BPH LBB RETRIP-M2	#BO.14	3	/147.E5
BUSBAR-3 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.E2
BB-3 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/175.E2
BAY-410 BB/LBB TRIP	#BO.17	8 / 7	
BAY-413 BB/LBB TRIP	#BO.18	9	
BAY-424 BB/LBB TRIP	#BO.19	11 / 10	
BAY-416 BB/LBB TRIP	#BO.20	12	
BAY-433 BB/LBB TRIP	#BO.21	14 / 13	
BAY-436 BB/LBB TRIP	#BO.22	15	
BAY-439 BB/LBB TRIP	#BO.23	17 / 16	
BAY-442 BB/LBB TRIP	#BO.24	18	

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 150
Doc. no. 1MNS801837-CGCA
n. sheet 151

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X51

BAY-410 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	/141.B2
BAY-410 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	/141.B2
BAY-410 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	/141.C2
BAY-410 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	/141.C2
BAY-413 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	/141.D2
BAY-413 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	/141.D2
BAY-413 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	/141.E2
BAY-413 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	/141.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X52

SPARE	(FUTURE USE)	P5#BI.09	220-250VDC	/142.B2
SPARE	(FUTURE USE)	P5#BI.10	220-250VDC	/142.B2
SPARE	(FUTURE USE)	P5#BI.11	220-250VDC	/142.C2
BAY-416 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	/142.C2
BAY-424 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	/142.D2
BAY-424 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	/142.D2
BAY-424 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	/142.E2
BAY-424 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	/142.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X71

BAY-433 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	/143.B2
BAY-433 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	/143.B2
BAY-433 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	/143.C2
BAY-433 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	/143.C2
BAY-436 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	/143.D2
BAY-436 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	/143.D2
BAY-436 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	/143.E2
BAY-436 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	/143.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X72

BAY-439 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	/144.B2
BAY-439 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	/144.B2
BAY-439 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	/144.C2
BAY-439 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	/144.C2
BAY-442 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	/144.D2
BAY-442 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	/144.D2
BAY-442 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	/144.E2
BAY-442 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	/144.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

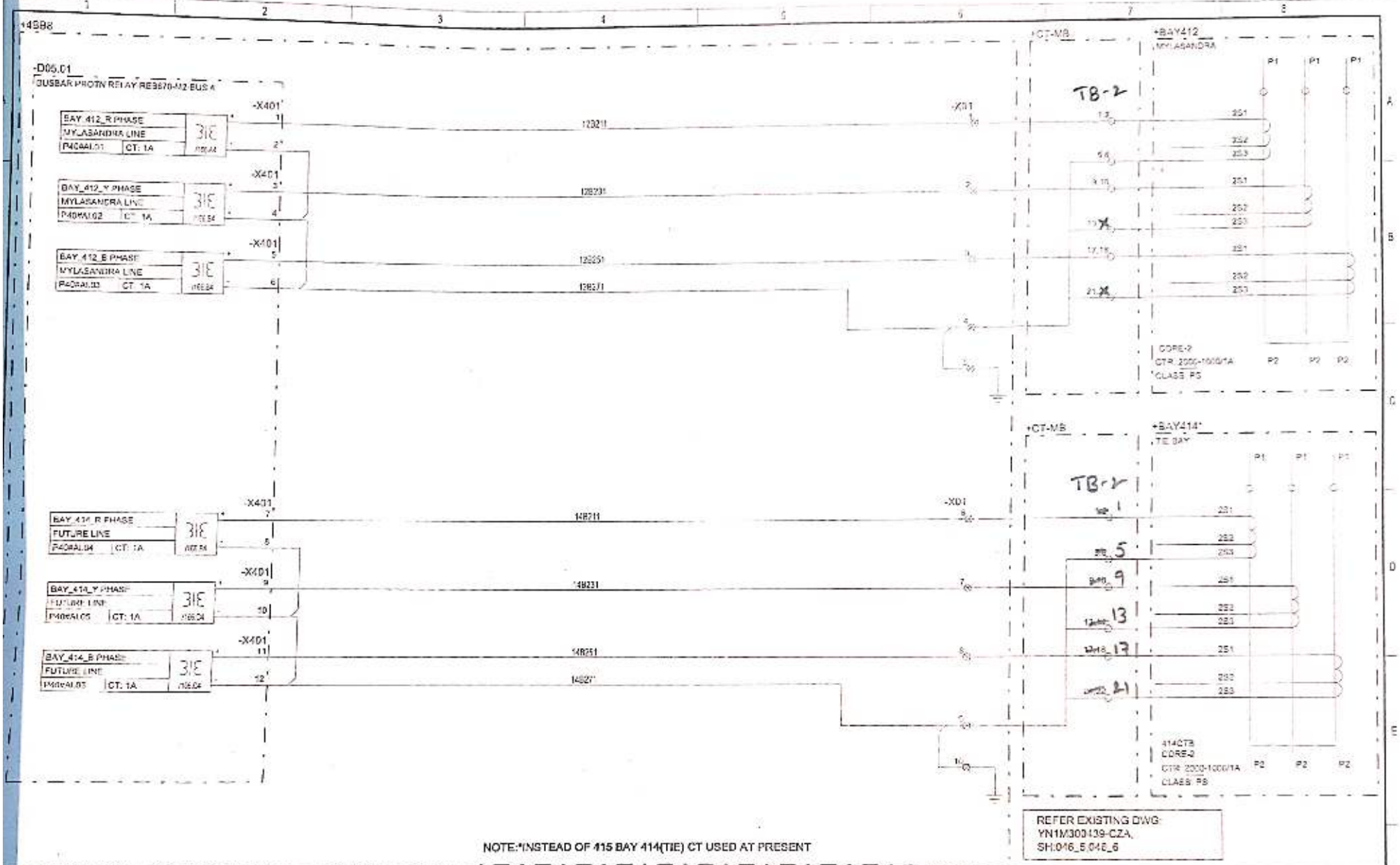
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 151
n. sheet 152

1MYN691003-102(A3)REV01

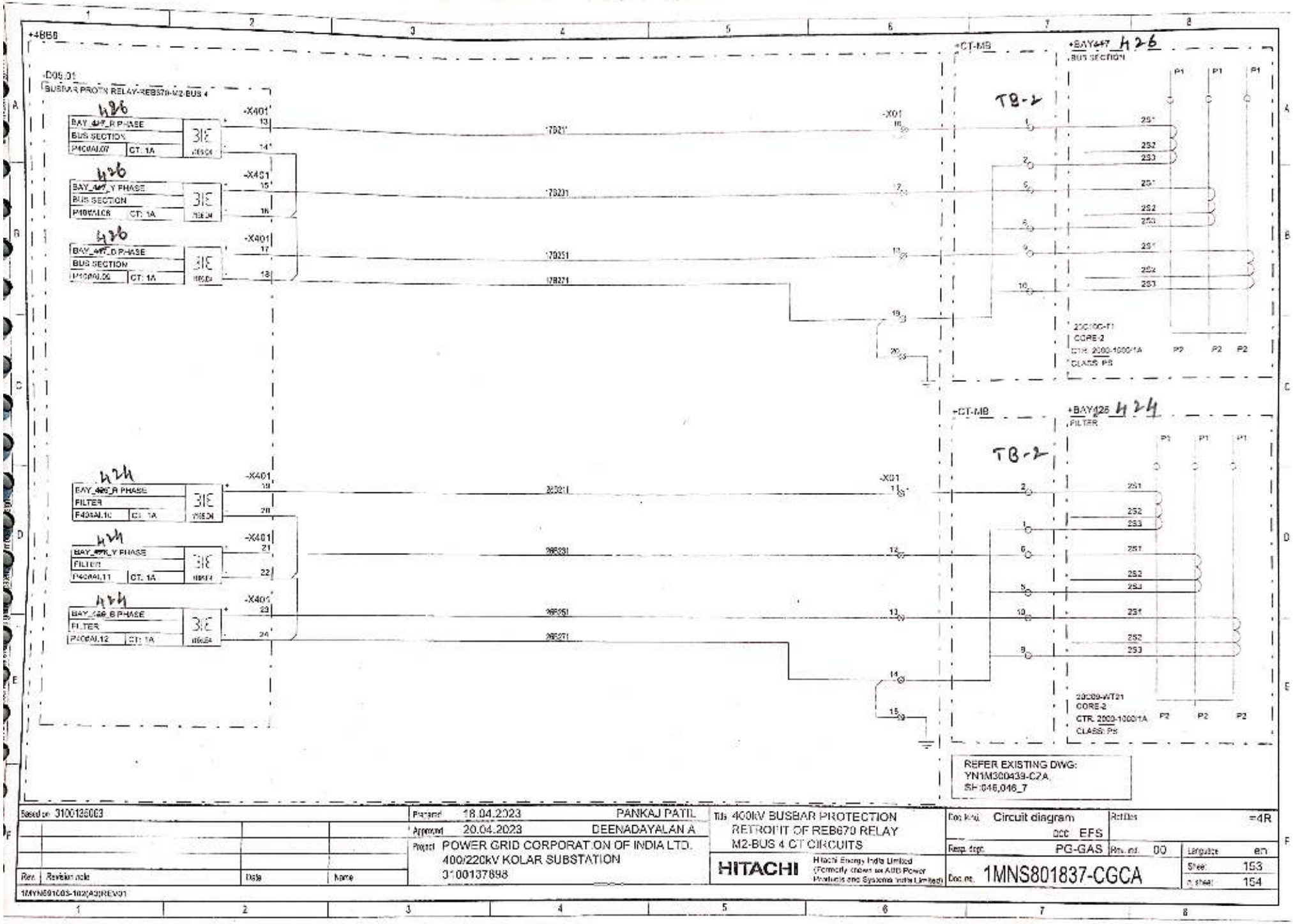
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



ord 3100135053	Prepared 18.04.2023 PANKAJ PATIL	TI: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 CT CIRCUITS	Doc.kind Circuit diagram DOC EFS	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A				
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as AEB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind 00	Language en
			Doc. no. 1MNS801837-CGCA	Sheet 152	n. shee 153
Revision note	Date Name				

09000-102[A3]REV01

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB8

-D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4

BAY_435_R PHASE			
FUTURE BAY			
P40#AI.01	CT: 1A		/166.A6

BAY_435_Y PHASE			
FUTURE BAY			
P40#AI.02	CT: 1A		/166.B6

BAY_435_B PHASE			
FUTURE BAY			
P40#AI.03	CT: 1A		/166.B6

-X401: + 1, - 2 | 35B212 | -D21.113.101: 7B | 7A /156.B8 | 35B211 | **-X01: 21

-X401: + 3, - 4 | 35B232 | 8B | 8A /156.B8 | 35B231 | 22

-X401: + 5, - 6 | 35B252 | 9B | 9A /156.B8 | 35B251 | 23

35B272 | 10B | 10A /156.B8 | 35B271 | 24

25

**

+CT-MB

+BAY435

FUTURE BAY

P1 P1 P1

2S1 2S2 2S3

2S1 2S2 2S3

2S1 2S2 2S3

CORE-2

CTR: 2000-1000/1A

CLASS: PS

P2 P2 P2

BAY_438_R PHASE			
FUTURE BAY			
P40#AI.04	CT: 1A		/166.B6

BAY_438_Y PHASE			
FUTURE BAY			
P40#AI.05	CT: 1A		/166.C6

BAY_438_B PHASE			
FUTURE BAY			
P40#AI.06	CT: 1A		/166.C6

-X401: + 7, - 8 | 38B212 | -D21.113.101: 11B | 11A /156.B8 | 38B211 | **-X01: 26

-X401: + 9, - 10 | 38B232 | 12B | 12A /156.B8 | 38B231 | 27

-X401: + 11, - 12 | 38B252 | 13B | 13A /156.C8 | 38B251 | 28

38B272 | 14B | 14A /156.C8 | 38B271 | 29

30

**

+CT-MB

+BAY438

FUTURE BAY

P1 P1 P1

2S1 2S2 2S3

2S1 2S2 2S3

2S1 2S2 2S3

CORE-2

CTR: 2000-1000/1A

CLASS: PS

P2 P2 P2

NOTE:
X01 TB GROUP TO
BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

NOTE ** TB TO BE IDENTIFY AT SITE

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL

Approved 20.04.2023 DEENADAYALAN A

Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram DCC EFS

Ref.Des. =4R

Resp. dept. PG-GAS

Rev. ind. 01

Language en

Doc. no. 1MNS801837-CGCA

Sheet 154

n. sheet 155

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

BAY_441_R PHASE			
FUTURE BAY			
P40#AI.07	CT: 1A	/166.C6	

BAY_441_Y PHASE			
FUTURE BAY			
P40#AI.08	CT: 1A	/166.D6	

BAY_441_B PHASE			
FUTURE BAY			
P40#AI.09	CT: 1A	/166.D6	

-X401 13(+) 14(-) 41B212
-X401 15(+) 16(-) 41B232
-X401 17(+) 18(-) 41B252
-X401 41B272

-D21.125.101
3A 41B211 /156.D8 — 3B
4A 41B231 /156.D8 — 4B
5A 41B251 /156.D8 — 5B
6A 41B271 /156.D8 — 6B

** -X01
31 32 33 34 35

+CT-MB

+BAY441
FUTURE BAY
P1 P1 P1
2S1 2S2 2S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

+CT-MB

+BAY444
FUTURE BAY

BAY_444_R PHASE			
FUTURE BAY			
P40#AI.10	CT: 1A	/166.D6	

BAY_444_Y PHASE			
FUTURE BAY			
P40#AI.11	CT: 1A	/166.E6	

BAY_444_B PHASE			
FUTURE BAY			
P40#AI.12	CT: 1A	/166.E6	

-X401 19(+) 20(-) 44B212
-X401 21(+) 22(-) 44B232
-X401 23(+) 24(-) 44B252
-X401 44B272

-D21.125.101
7A 44B211 /156.D8 — 7B
8A 44B231 /156.D8 — 8B
9A 44B251 /156.E8 — 9B
10A 44B271 /156.E8 — 10B

** -X01
36 37 38 39 40

P1 P1 P1
2S1 2S2 2S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 155
n. sheet 156

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB8

FROM SH: 031/4

-X13 -B13-01 -B13-02

PSM -X11

90-250VDC

PE /166.B1

K801 +D.23-D23.02:1P3 /157.A5

K802 +B.09-1XX2:1 /157.A3

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 048

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

-D21.101.101

Test / Normal		
1B	1A	
2B	2A	
3B	3A	
4B	4A	/152.A4
5B	5A	/152.B4
6B	6A	/152.B4
7B	7A	/152.B4
8B	8A	/152.D4
9B	9A	/152.D4
10B	10A	/152.E4
11B	11A	/152.E4
12B	12A	/153.A4
13B	13A	/153.B4
14B	14A	/153.B4
15B	15A	/153.B4
16B	16A	
17B	17A	
18B	18A	

-D21.113.101

Test / Normal		
1B	1A	
2B	2A	
3B	3A	/153.D4
4B	4A	/153.D4
5B	5A	/153.E4
6B	6A	/153.E4
7B	7A	/154.A4
8B	8A	/154.B4
9B	9A	/154.B4
10B	10A	/154.B4
11B	11A	/154.D4
12B	12A	/154.D4
13B	13A	/154.E4
14B	14A	/154.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.125.101

Test / Normal		
1B	1A	
2B	2A	
3B	3A	/155.A4
4B	4A	/155.B4
5B	5A	/155.B4
6B	6A	/155.B4
7B	7A	/155.D4
8B	8A	/155.D4
9B	9A	/155.E4
10B	10A	/155.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
	DCC EFS		
Resp. dept.	PG-GAS	Rev. ind.	01
Language	en		
Sheet	156		
n. sheet	157		
Doc. no.	1MNS801837-CGCA		

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

+D.05-D05.01:5 (-X11) /156.B2 K802

+D.05-D05.01:4 (-X11) /156.B2 K801

-X31 1	MAIN 2 BUS 4 PROT IN	P3#BI.01 220-250VDC	/167.A2
-X31 3	MAIN 2 BUS 4 PROT OUT	P3#BI.02 220-250VDC	/167.B2
-X31 5	SPARE	P3#BI.03 220-250VDC	/167.B2
-X31 7	TRIP RELAY RESET 96B BUS-4	P3#BI.04 220-250VDC	/167.B2
-X31 9	SPARE	P3#BI.05 220-250VDC	/167.C2
-X31 11	SPARE	P3#BI.06 220-250VDC	/167.C2
-X31 13	SPARE	P3#BI.07 220-250VDC	/167.C2
-X31 15	REB670 RELAY FAULTY BUS 4 - MAIN 1	P3#BI.08 220-250VDC	/167.D2

-1XX2 1

K803 -D23.02 1P3 1P4 /157.A7 IN
BB-4 M2 IN/OUT SWITCH

K804 -D23.02 1P2 /157.A7 OUT 1P1
BB-4 M2 IN/OUT SWITCH

K805 -8X04 1

K801 /171.E8

K806 /171.D5 +D.13-D13.101.101:221 -8X04 2

K807 3

K808 4

K809 5

K810 -X14A 3 -X14A 3 +D.05 -X11 2

-X14A 4 -X14A 4 -X11 3 BUSBAR RELAY FAULTY BUS-4 MAIN-1 /94.B2 -X11 1

+4BB8

-D23.02
1P2 /157.B4
1P1 C 1P3
1P4 /157.B3
A
2P2
2P1 C 2P3
2P4
A
3P2
3P1 C 3P3
3P4
A
4P2
4P1 C 4P3
4P4
A
IN A
OUT C

BB-4 M2 IN/OUT SWITCH

+4BB4

NOTE:
8X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

+B.09-1XX2:2 K802 /158.A3

+B.33-X04:13 K801 /158.A5

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

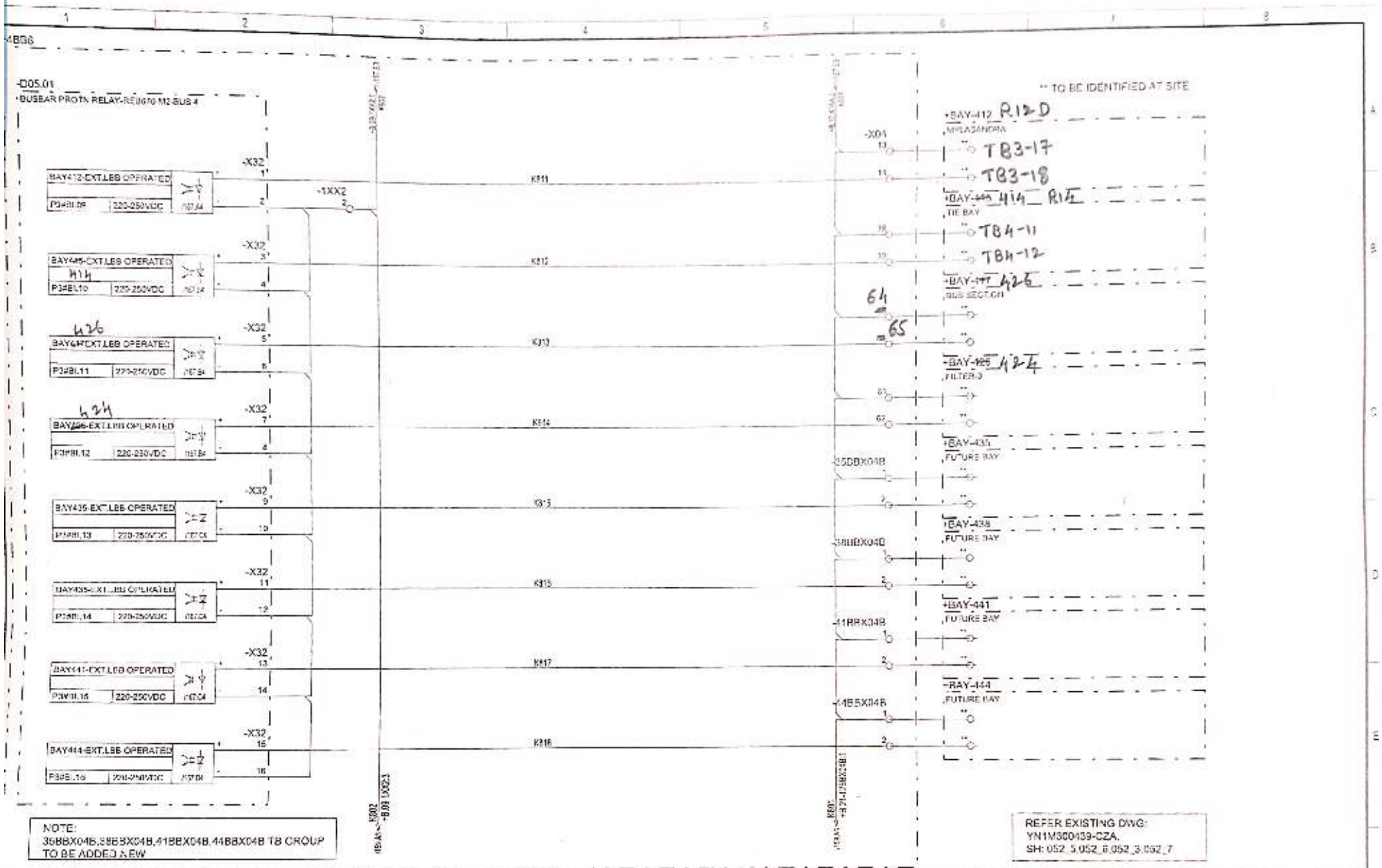
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 157
n. sheet 158

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Prepared	18.04.2023	PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS	Doc kind: Circuit diagram	Ref.Des. R4R
Approved	20.04.2023	DEENADAYALAN A		DOC EFS	
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137895			Resp. dept. PG-GAS	Rev. ind. 00
			HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Language en
					Sheet 158
					No. of sheets 159

Revision note | Date | Name

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 /1158.E3
+B.09-1XX2:2

K801 /1158.E5
+B.33-44BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-412
MYLASANDRA
REF.DRG.NO:####
SHT.NO:##

-12BBX04B

BAY-412 RPH LBB INIT.		-X51 + 1	K819	-1XX2 3	1	**
(FUTURE USE)					2	**
P5#BI.01	220-250VDC	- 2 /169.A2				
BAY-412 YPH LBB INIT.		-X51 + 3	K820		3	**
(FUTURE USE)						
P5#BI.02	220-250VDC	- 4 /169.B2				
BAY-412 BPH LBB INIT.		-X51 + 5	K821		4	**
(FUTURE USE)						
P5#BI.03	220-250VDC	- 6 /169.B2				
BAY-412 3PH LBB INIT.		-X51 + 7	K822		5	**
(FUTURE USE)						
P5#BI.04	220-250VDC	- 8 /169.B2				

+BAY-415
TIE BAY
REF.DRG.NO:####
SHT.NO:##

-15BBX04B

BAY-415 RPH LBB INIT.		-X51 + 9	K823		1	**
(FUTURE USE)					2	**
P5#BI.05	220-250VDC	- 10 /169.C2				
BAY-415 YPH LBB INIT.		-X51 + 11	K824		3	**
(FUTURE USE)						
P5#BI.06	220-250VDC	- 12 /169.C2				
BAY-415 BPH LBB INIT.		-X51 + 13	K825		4	**
(FUTURE USE)						
P5#BI.07	220-250VDC	- 14 /169.C2				
BAY-415 3PH LBB INIT.		-X51 + 15	K826		5	**
(FUTURE USE)						
P5#BI.08	220-250VDC	- 16 /169.D2				

K802 /160.A3
+B.09-1XX2:4

K801 /160.A6
+B.25-17BBX04B:1

NOTE:
12BBX04B,15BBX04B TB GROUP TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 159
n. sheet 160

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 ◁/159.E3
+B.09-1XX2:3

K801 ◁/159.E6
+B.21-15BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X52	1 (+)	K827
(FUTURE USE)			2 (-)	-1XX2 4
P5#BI.09	220-250VDC	/169.A4		
SPARE		-X52	3 (+)	K828
(FUTURE USE)			4 (-)	
P5#BI.10	220-250VDC	/169.B4		
SPARE		-X52	5 (+)	K829
(FUTURE USE)			6 (-)	
P5#BI.11	220-250VDC	/169.B4		
BAY-417 3PH LBB INIT.		-X52	7 (+)	K830
(FUTURE USE)			8 (-)	
P5#BI.12	220-250VDC	/169.B4		
BAY-426 RPH LBB INIT.		-X52	9 (+)	K831
(FUTURE USE)			10 (-)	
P5#BI.13	220-250VDC	/169.C4		
BAY-426 YPH LBB INIT.		-X52	11 (+)	K832
(FUTURE USE)			12 (-)	
P5#BI.14	220-250VDC	/169.C4		
BAY-426 BPH LBB INIT.		-X52	13 (+)	K833
(FUTURE USE)			14 (-)	
P5#BI.15	220-250VDC	/169.C4		
BAY-426 3PH LBB INIT.		-X52	15 (+)	K834
(FUTURE USE)			16 (-)	
P5#BI.16	220-250VDC	/169.D4		

-17BBX04B
1 ** 2 ** 3 ** 4 ** 5 **

+BAY-417
BUS SECTION
REF.DRG.NO:####
SHT.NO:##

-26BBX04B
1 ** 2 ** 3 ** 4 ** 5 **

+BAY-426
FILTER-3
REF.DRG.NO:####
SHT.NO:##

K802
+B.09-1XX2:5
/161.A3 ◁

K801
+B.29-35BBX04B:3
/161.A6 ◁

NOTE:
17BBX04B,26BBX04B TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 160
n. sheet 161

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 /160.E3
+B.09-1XX2:4

K801 /160.E6
+B.25-26BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-435
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

-35BBX04B

BAY-435 RPH LBB INIT.		-X71 +	1	K835	4
(FUTURE USE)				-1XX2	5
P7#BI.01	220-250VDC	/169.A6 -	2		
BAY-435 YPH LBB INIT.		-X71 +	3	K836	5
(FUTURE USE)					
P7#BI.02	220-250VDC	/169.B6 -	4		
BAY-435 BPH LBB INIT.		-X71 +	5	K837	6
(FUTURE USE)					
P7#BI.03	220-250VDC	/169.B6 -	6		
BAY-435 3PH LBB INIT.		-X71 +	7	K838	7
(FUTURE USE)					
P7#BI.04	220-250VDC	/169.B6 -	8		

+BAY-438
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

-38BBX04B

BAY-438 RPH LBB INIT.		-X71 +	9	K839	4
(FUTURE USE)					
P7#BI.05	220-250VDC	/169.C6 -	10		
BAY-438 YPH LBB INIT.		-X71 +	11	K840	5
(FUTURE USE)					
P7#BI.06	220-250VDC	/169.C6 -	12		
BAY-438 BPH LBB INIT.		-X71 +	13	K841	6
(FUTURE USE)					
P7#BI.07	220-250VDC	/169.C6 -	14		
BAY-438 3PH LBB INIT.		-X71 +	15	K842	7
(FUTURE USE)					
P7#BI.08	220-250VDC	/169.D6 -	16		

K802 /162.A3
+B.09-1XX2:6

K801 /162.A6
+B.33-41BBX04B:3

NOTE:
35BBX04B,38BBX04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 161
n. sheet 162

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 /161.E3
+B.09-1XX2:5

K801 /161.E6
+B.29-38BBX04B:3

** TO BE IDENTIFIED AT SITE

BAY-441 RPH LBB INIT.		-X72 + 1	K843
(FUTURE USE)		-1XX2 6	
P7#BI.09	220-250VDC	- 2	/169.A7
BAY-441 YPH LBB INIT.		-X72 + 3	K844
(FUTURE USE)			
P7#BI.10	220-250VDC	- 4	/169.B7
BAY-441 BPH LBB INIT.		-X72 + 5	K845
(FUTURE USE)			
P7#BI.11	220-250VDC	- 6	/169.B7
BAY-441 3PH LBB INIT.		-X72 + 7	K846
(FUTURE USE)			
P7#BI.12	220-250VDC	- 8	/169.B7
BAY-444 RPH LBB INIT.		-X72 + 9	K847
(FUTURE USE)			
P7#BI.13	220-250VDC	- 10	/169.C7
BAY-444 YPH LBB INIT.		-X72 + 11	K848
(FUTURE USE)			
P7#BI.14	220-250VDC	- 12	/169.C7
BAY-444 BPH LBB INIT.		-X72 + 13	K849
(FUTURE USE)			
P7#BI.15	220-250VDC	- 14	/169.C7
BAY-444 3PH LBB INIT.		-X72 + 15	K850
(FUTURE USE)			
P7#BI.16	220-250VDC	- 16	/169.D7

+BAY-441
FUTURE BAY
-41BBX04B
REF.DRG.NO:####
SHT.NO:##

+BAY-444
FUTURE BAY
-44BBX04B
REF.DRG.NO:####
SHT.NO:##

NOTE:
41BBX04B,44BBX04B TB GROUP
TO BE ADDED NEW

K802 /164.A5
+B.33-X04:154

K801 /164.A5
+D.05-D05.01:2 (-X41)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

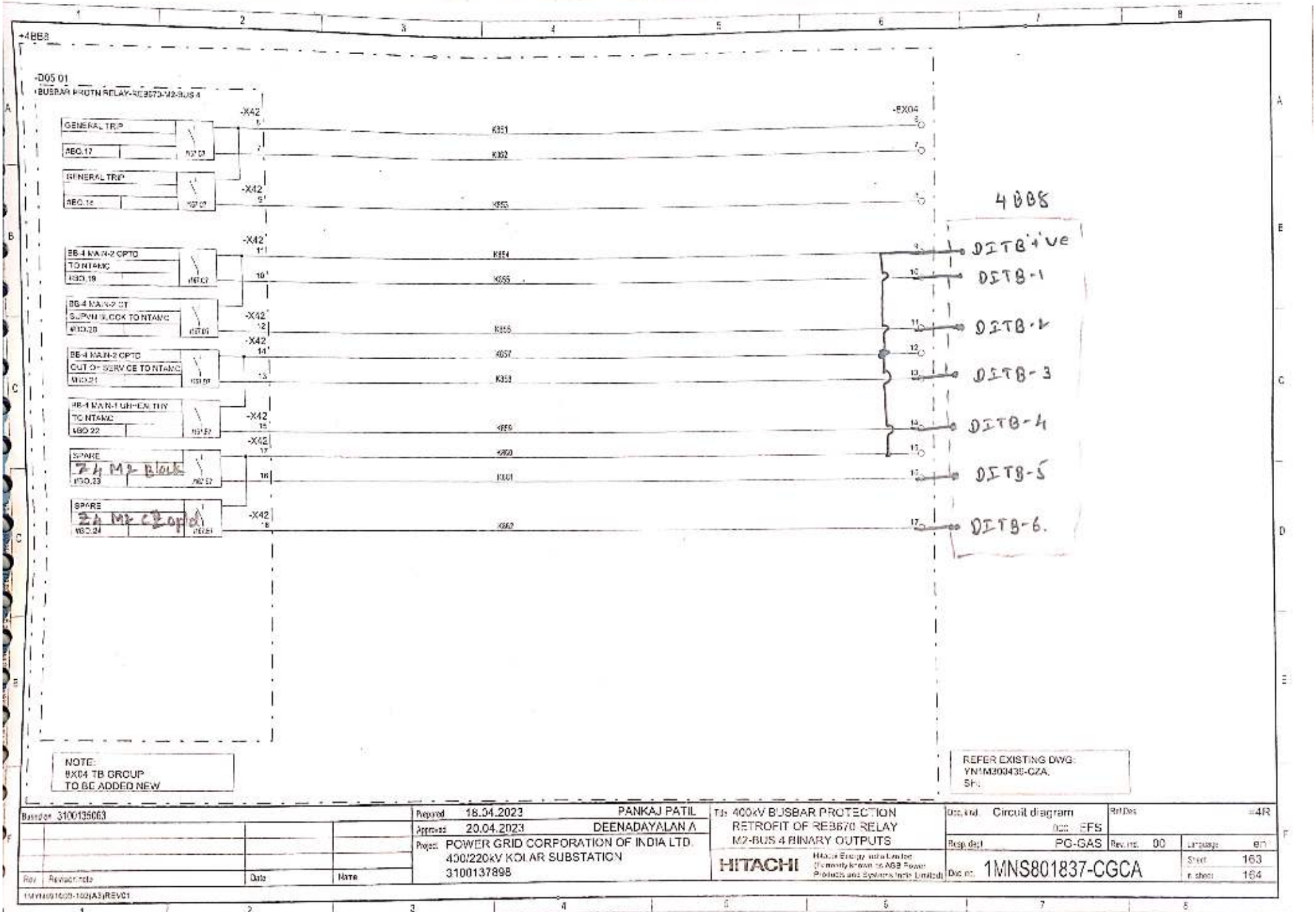
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

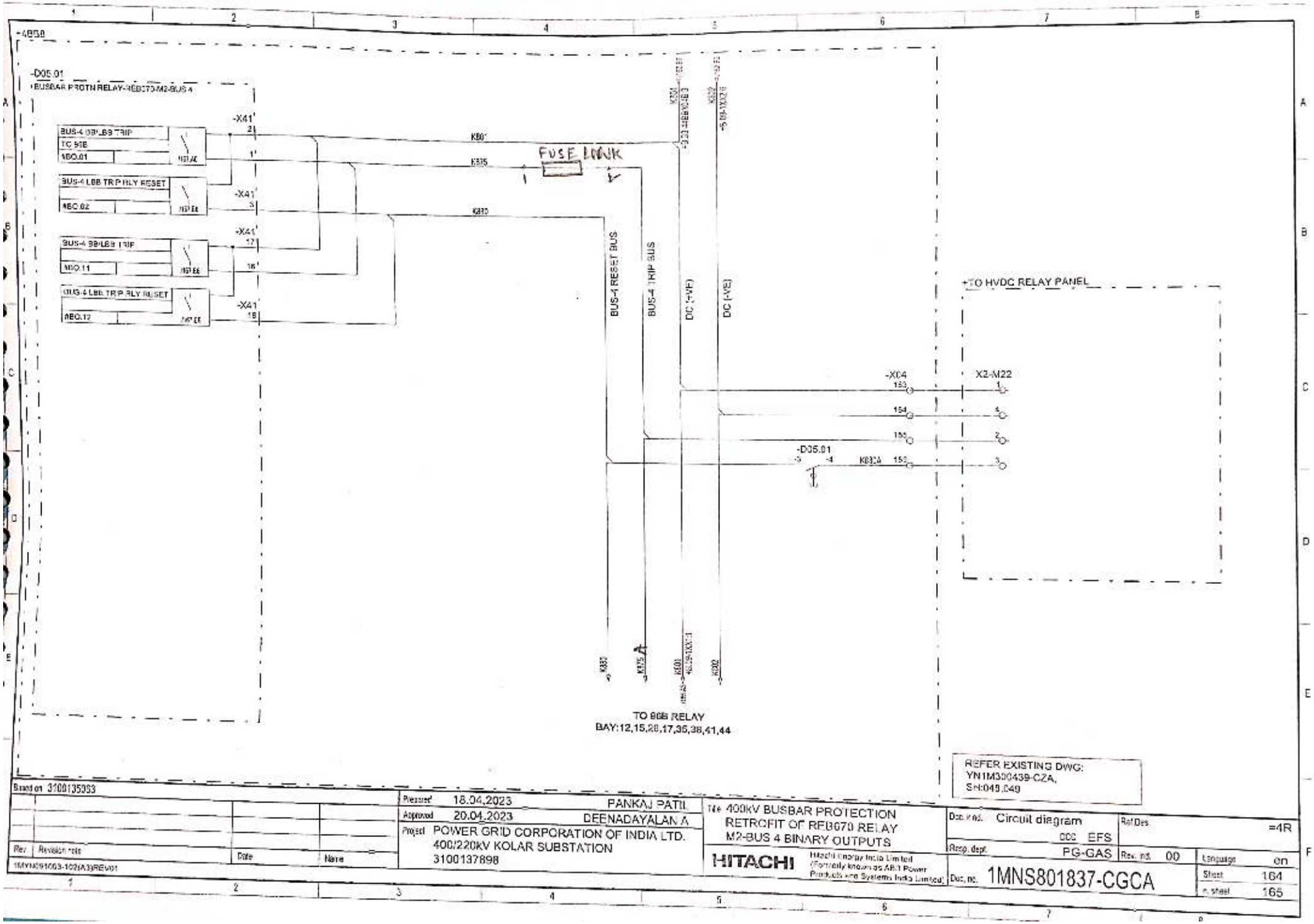
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 162
n. sheet 163

1MYN691003-102(A3)REV01



Basedgr 3100135063	Prepared 18.04.2023 PANKAJ PATIL	TI: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY OUTPUTS	Doc. kind Circuit diagram	Ref.Des	=4R
	Approved 20.04.2023 DEENADAYALAN A		Doc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept PG-GAS	Rev. no. 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 163	
1MYM801600-102(A3)REV01				n. sheet 164	

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K801 /164.E5 +B.33-X04:153

BAY-412 RPH LBB RETRIP-M2	#BO.03	/167.B6	-X41 5	-1XX1 1	-8X04 18
			-X41 4		8P13
BAY-412 YPH LBB RETRIP-M2	#BO.04	/167.C6	-X41 6		19
					8P15
BAY-412 BPH LBB RETRIP-M2	#BO.05	/167.C6	-X41 8		20
			-X41 7		8P17
BAY-414 RPH LBB RETRIP-M2	#BO.06	/167.C6	-X41 9		21
					8P19
BAY-414 YPH LBB RETRIP-M2	#BO.07	/167.C6	-X41 11	-1XX1 2	22
			-X41 10		8P21
BAY-414 BPH LBB RETRIP-M2	#BO.08	/167.D6	-X41 12		23
					8P23
BAY-426 RPH LBB RETRIP-M2	#BO.09	/167.D6	-X41 14		24
			-X41 13		8P25
BAY-426 YPH LBB RETRIP-M2	#BO.10	/167.E6	-X41 15		25
					8P27
BAY-426 BPH LBB RETRIP-M2	#BO.01	/168.A2	-X61 2	-1XX1 3	26
			-X61 1		8P29
BAY-417 LBB RETRIP-M2	#BO.02	/168.B2	-X61 3		27
					8P31
BAY-435 RPH LBB RETRIP-M2	#BO.03	/168.B2	-X61 5		28
			-X61 4		8P33
BAY-435 YPH LBB RETRIP-M2	#BO.04	/168.B2	-X61 6		29
					8P35

K801 /165.A6 +B.09-1XX1:4

NOTE:
1XX1, 8X04 TB GROUP
TO BE ADDED NEW

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K801 /165.E3 +B.09-1XX1:3

BAY-435 BPH LBB RETRIP-M2	#BO.05	/168.C2	-X61 8	-1XX1 4	-8X04 30
			-X61 7		8P37
BAY-438 RPH LBB RETRIP-M2	#BO.06	/168.C2	-X61 9		31
					8P39
BAY-438 YPH LBB RETRIP-M2	#BO.07	/168.C2	-X61 11		32
			-X61 10		8P41
BAY-438 BPH LBB RETRIP-M2	#BO.08	/168.D2	-X61 12		33
					8P43
BAY-441 RPH LBB RETRIP-M2	#BO.09	/168.D2	-X61 14	-1XX1 5	34
			-X61 13		8P45
BAY-441 YPH LBB RETRIP-M2	#BO.10	/168.D2	-X61 15		35
					8P47
BAY-441 BPH LBB RETRIP-M2	#BO.11	/168.E2	-X61 17		36
			-X61 16		8P49
BAY-444 RPH LBB RETRIP-M2	#BO.12	/168.E2	-X61 18		37
					8P51
BAY-444 YPH LBB RETRIP-M2	#BO.13	/168.A4	-X62 2	-1XX1 6	38
			-X62 1		8P53
BAY-444 BPH LBB RETRIP-M2	#BO.14	/168.B4	-X62 3		39
					8P55

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 165
n. sheet 166

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
PSM
90-250VDC

-X11

4 +
5 -
/156.B3
90-250VDC
PE

-X11
2
3 /85.E7
1

BUSBAR RELAY FAULTY
BUS-4 MAIN-2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
TRM
1A, 50/60Hz

-X401

BAY_412_R PHASE MYLASANDRA LINE P40#AI.01 CT: 1A	+ 1 - 2	/152.A2	BAY_435_R PHASE FUTURE BAY P40#AI.01 CT: 1A	+ 1 - 2	/154.A2
BAY_412_Y PHASE MYLASANDRA LINE P40#AI.02 CT: 1A	+ 3 - 4	/152.B2	BAY_435_Y PHASE FUTURE BAY P40#AI.02 CT: 1A	+ 3 - 4	/154.B2
BAY_412_B PHASE MYLASANDRA LINE P40#AI.03 CT: 1A	+ 5 - 6	/152.B2	BAY_435_B PHASE FUTURE BAY P40#AI.03 CT: 1A	+ 5 - 6	/154.B2
BAY_414_R PHASE FUTURE LINE P40#AI.04 CT: 1A	+ 7 - 8	/152.D2	BAY_438_R PHASE FUTURE BAY P40#AI.04 CT: 1A	+ 7 - 8	/154.D2
BAY_414_Y PHASE FUTURE LINE P40#AI.05 CT: 1A	+ 9 - 10	/152.D2	BAY_438_Y PHASE FUTURE BAY P40#AI.05 CT: 1A	+ 9 - 10	/154.D2
BAY_414_B PHASE FUTURE LINE P40#AI.06 CT: 1A	+ 11 - 12	/152.E2	BAY_438_B PHASE FUTURE BAY P40#AI.06 CT: 1A	+ 11 - 12	/154.E2
BAY_417_R PHASE BUS SECTION P40#AI.07 CT: 1A	+ 13 - 14	/153.A2	BAY_441_R PHASE FUTURE BAY P40#AI.07 CT: 1A	+ 13 - 14	/155.A2
BAY_417_Y PHASE BUS SECTION P40#AI.08 CT: 1A	+ 15 - 16	/153.B2	BAY_441_Y PHASE FUTURE BAY P40#AI.08 CT: 1A	+ 15 - 16	/155.B2
BAY_417_B PHASE BUS SECTION P40#AI.09 CT: 1A	+ 17 - 18	/153.B2	BAY_441_B PHASE FUTURE BAY P40#AI.09 CT: 1A	+ 17 - 18	/155.B2
BAY_426_R PHASE FILTER P40#AI.10 CT: 1A	+ 19 - 20	/153.D2	BAY_444_R PHASE FUTURE BAY P40#AI.10 CT: 1A	+ 19 - 20	/155.D2
BAY_426_Y PHASE FILTER P40#AI.11 CT: 1A	+ 21 - 22	/153.D2	BAY_444_Y PHASE FUTURE BAY P40#AI.11 CT: 1A	+ 21 - 22	/155.D2
BAY_426_B PHASE FILTER P40#AI.12 CT: 1A	+ 23 - 24	/153.E2	BAY_444_B PHASE FUTURE BAY P40#AI.12 CT: 1A	+ 23 - 24	/155.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 166
n. sheet 167

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X31

MAIN 2 BUS 4 PROT IN	P3#BI.01	220-250VDC	1 / 2	/157.B2
MAIN 2 BUS 4 PROT OUT	P3#BI.02	220-250VDC	3 / 4	/157.B2
SPARE	P3#BI.03	220-250VDC	5 / 6	/157.C2
TRIP RELAY RESET 96B BUS-4	P3#BI.04	220-250VDC	7 / 8	/157.C2
SPARE	P3#BI.05	220-250VDC	9 / 10	/157.C2
SPARE	P3#BI.06	220-250VDC	11 / 12	/157.D2
SPARE	P3#BI.07	220-250VDC	13 / 14	/157.D2
REB670 RELAY FAULTY BUS 4 - MAIN 1	P3#BI.08	220-250VDC	15 / 16	/157.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X32

BAY412-EXT.LBB OPERATED	P3#BI.09	220-250VDC	1 / 2	/158.B2
BAY415-EXT.LBB OPERATED	P3#BI.10	220-250VDC	3 / 4	/158.B2
BAY417EXT.LBB OPERATED	P3#BI.11	220-250VDC	5 / 6	/158.C2
BAY426-EXT.LBB OPERATED	P3#BI.12	220-250VDC	7 / 8	/158.C2
BAY435-EXT.LBB OPERATED	P3#BI.13	220-250VDC	9 / 10	/158.D2
BAY438-EXT.LBB OPERATED	P3#BI.14	220-250VDC	11 / 12	/158.D2
BAY441-EXT.LBB OPERATED	P3#BI.15	220-250VDC	13 / 14	/158.E2
BAY444-EXT.LBB OPERATED	P3#BI.16	220-250VDC	15 / 16	/158.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X41

BUS-4 BB/LBB TRIP TO 96B	#BO.01	2 / 1	/164.B2
BUS-4 LBB TRIP RLY RESET	#BO.02	3	/164.B2
BAY-412 RPH LBB RETRIP-M2	#BO.03	5 / 4	/165.B2
BAY-412 YPH LBB RETRIP-M2	#BO.04	6	/165.B2
BAY-412 BPH LBB RETRIP-M2	#BO.05	8 / 7	/165.B2
BAY-414 RPH LBB RETRIP-M2	#BO.06	9	/165.C2
BAY-414 YPH LBB RETRIP-M2	#BO.07	11 / 10	/165.C2
BAY-414 BPH LBB RETRIP-M2	#BO.08	12	/165.C2
BAY-426 RPH LBB RETRIP-M2	#BO.09	14 / 13	/165.D2
BAY-426 YPH LBB RETRIP-M2	#BO.10	15	/165.D2
BUS-4 BB/LBB TRIP	#BO.11	17 / 16	/164.B2
BUS-4 LBB TRIP RLY RESET	#BO.12	18	/164.C2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X42

BUSBAR-4 OPTD ANNUNCIATION CKT	#BO.13	2 / 1	/173.D3
BB-4 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.D3
BUSBAR-4 Rph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.D6
BUSBAR-4 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.E6
GENERAL TRIP	#BO.17	8 / 7	/163.A2
GENERAL TRIP	#BO.18	9	/163.B2
BB-4 MAIN-2 OPTD TO NTAMC	#BO.19	11 / 10	/163.B2
BB-4 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/163.C2
BB-4 MAIN-2 OPTD OUT OF SERVICE TO NTAMC	#BO.21	14 / 13	/163.C2
BB-4 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/163.C2
SPARE	#BO.23	17 / 16	/163.D2
SPARE	#BO.24	18	/163.D2

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Resp. dept. PG-GAS
Doc. no. 1MNS801837-CGCA
Ref.Des. =4R
Rev. ind. 01
Language en
Sheet 167
n. sheet 168

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X61

BAY-426 BPH LBB RETRIP-M2 #BO.01	2	1	/165.D2
BAY-417 LBB RETRIP-M2 #BO.02	3		/165.E2
BAY-435 RPH LBB RETRIP-M2 #BO.03	5	4	/165.E2
BAY-435 YPH LBB RETRIP-M2 #BO.04	6		/165.E2
BAY-435 BPH LBB RETRIP-M2 #BO.05	8	7	/165.B5
BAY-438 RPH LBB RETRIP-M2 #BO.06	9		/165.B5
BAY-438 YPH LBB RETRIP-M2 #BO.07	11	10	/165.B5
BAY-438 BPH LBB RETRIP-M2 #BO.08	12		/165.C5
BAY-441 RPH LBB RETRIP-M2 #BO.09	14	13	/165.C5
BAY-441 YPH LBB RETRIP-M2 #BO.10	15		/165.C5
BAY-441 BPH LBB RETRIP-M2 #BO.11	17	16	/165.D5
BAY-444 RPH LBB RETRIP-M2 #BO.12	18		/165.D5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X62

BAY-444 YPH LBB RETRIP-M2 #BO.13	2	1	/165.D5
BAY-444 BPH LBB RETRIP-M2 #BO.14	3		/165.E5
BUSBAR-4 Bph OPTD EVENT LOGGER CKT #BO.15	5	4	/175.E6
BB-4 CT SUPVN EVENT LOGGER CKT #BO.16	6		/175.E6
SPARE #BO.17	8	7	
SPARE #BO.18	9		
SPARE #BO.19	11	10	
SPARE #BO.20	12		
SPARE #BO.21	14	13	
SPARE #BO.22	15		
SPARE #BO.23	17	16	
SPARE #BO.24	18		

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 168
n. sheet 169

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X51

BAY-412 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	+ 1 / - 2 /159.B2
BAY-412 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	+ 3 / - 4 /159.B2
BAY-412 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	+ 5 / - 6 /159.C2
BAY-412 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	+ 7 / - 8 /159.C2
BAY-415 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	+ 9 / - 10 /159.D2
BAY-415 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	+ 11 / - 12 /159.D2
BAY-415 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	+ 13 / - 14 /159.E2
BAY-415 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	+ 15 / - 16 /159.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X52

SPARE	(FUTURE USE)	P5#BI.09	220-250VDC	+ 1 / - 2 /160.B2
SPARE	(FUTURE USE)	P5#BI.10	220-250VDC	+ 3 / - 4 /160.B2
SPARE	(FUTURE USE)	P5#BI.11	220-250VDC	+ 5 / - 6 /160.C2
BAY-417 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	+ 7 / - 8 /160.C2
BAY-426 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	+ 9 / - 10 /160.D2
BAY-426 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	+ 11 / - 12 /160.D2
BAY-426 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	+ 13 / - 14 /160.E2
BAY-426 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	+ 15 / - 16 /160.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X71

BAY-435 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	+ 1 / - 2 /161.B2
BAY-435 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	+ 3 / - 4 /161.B2
BAY-435 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	+ 5 / - 6 /161.C2
BAY-435 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	+ 7 / - 8 /161.C2
BAY-438 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	+ 9 / - 10 /161.D2
BAY-438 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	+ 11 / - 12 /161.D2
BAY-438 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	+ 13 / - 14 /161.E2
BAY-438 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	+ 15 / - 16 /161.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X72

BAY-441 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	+ 1 / - 2 /162.B2
BAY-441 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	+ 3 / - 4 /162.B2
BAY-441 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	+ 5 / - 6 /162.C2
BAY-441 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	+ 7 / - 8 /162.C2
BAY-444 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	+ 9 / - 10 /162.D2
BAY-444 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	+ 11 / - 12 /162.D2
BAY-444 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	+ 13 / - 14 /162.E2
BAY-444 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	+ 15 / - 16 /162.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 169
n. sheet 170

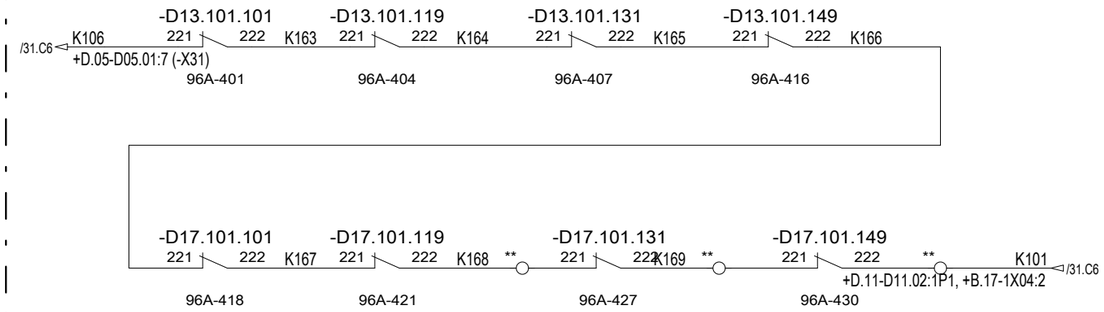
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

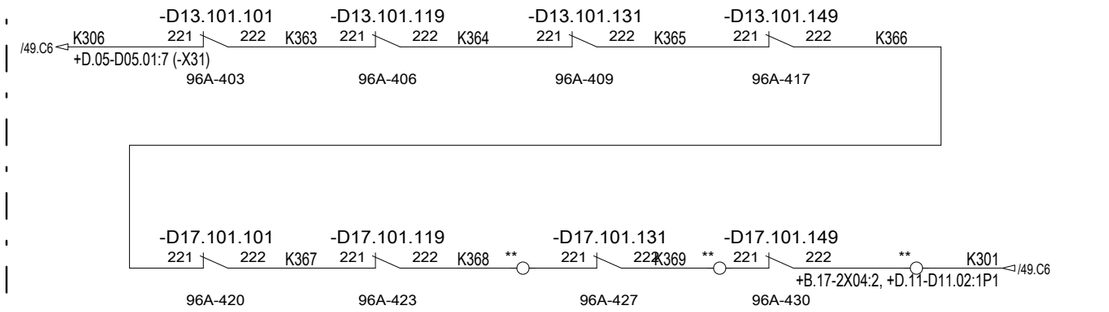
+4BB1

BUS 1 96A RESET



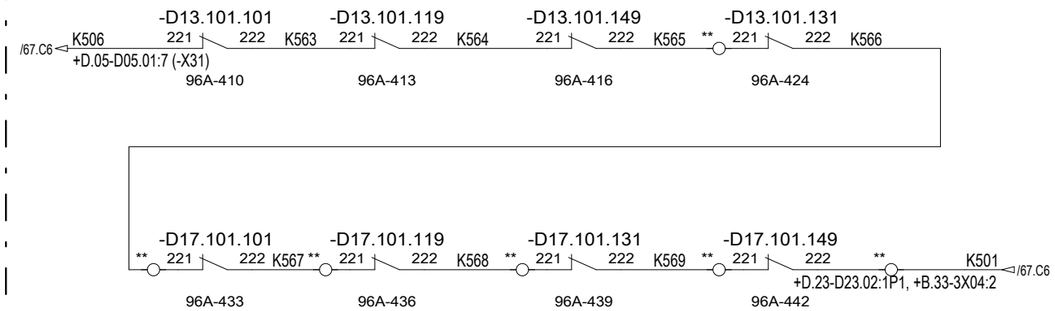
+4BB2

BUS 2 96A RESET



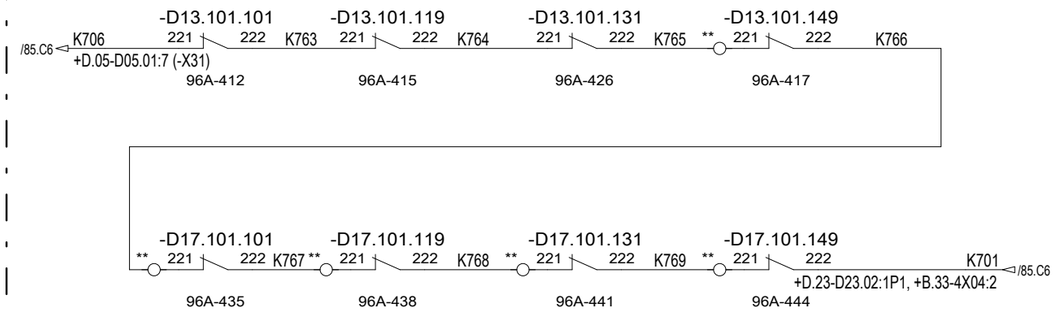
+4BB3

BUS 3 96A RESET



+4BB4

BUS 4 96A RESET



NOTE:-**TB NO's TO BE
IDENTIFIED AT SITE

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY 96A OPTD

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 170
n. sheet 171

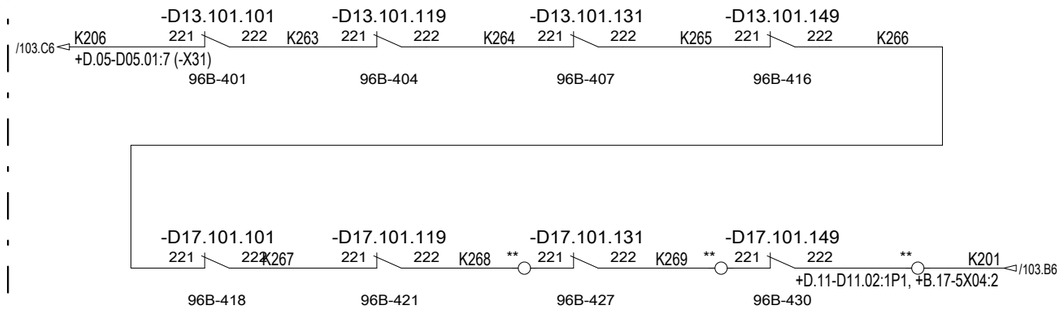
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

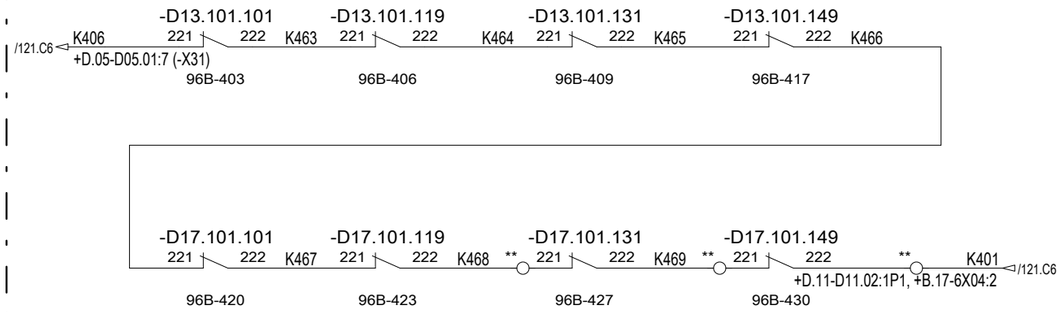
+4BB5

BUS 1 96B RESET



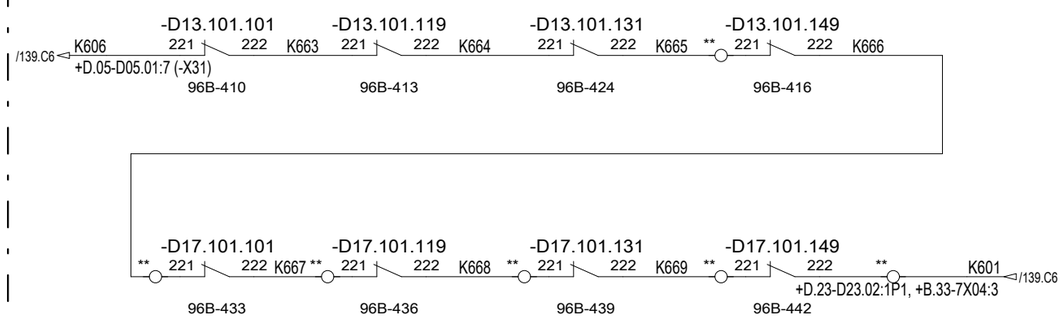
+4BB6

BUS 2 96B RESET



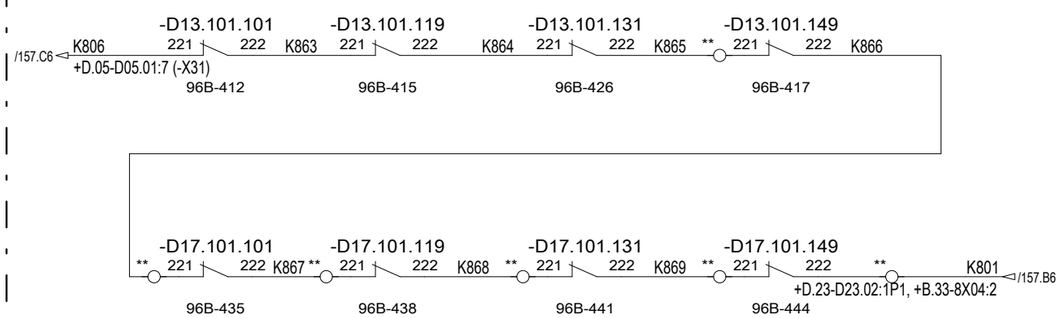
+4BB7

BUS 3 96B RESET



+4BB8

BUS 4 96B RESET



NOTE:-**TB NO's TO BE
IDENTIFIED AT SITE

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
96B OPTD

HITACHI Hitachi Energy India Limited

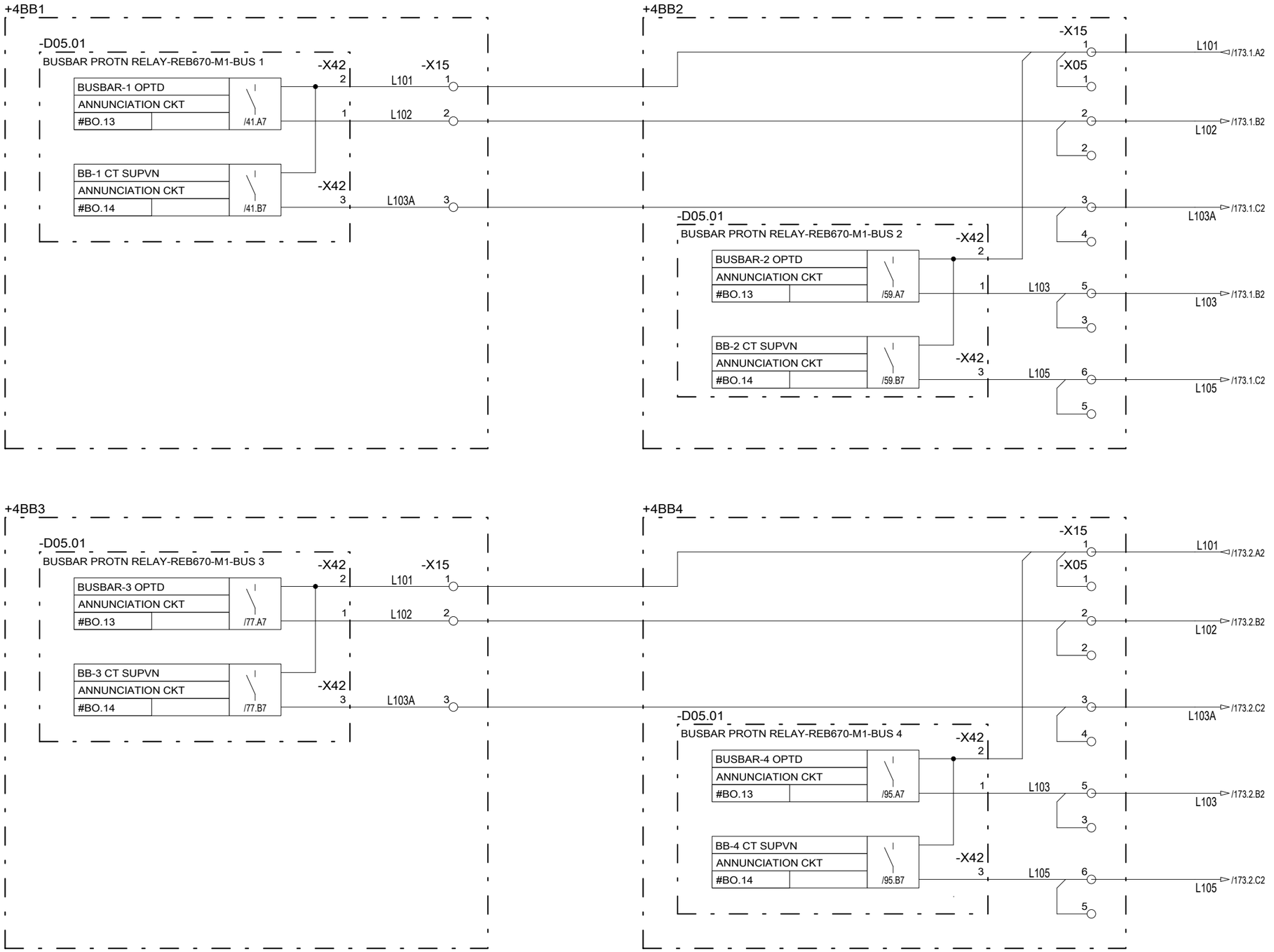
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 171
n. sheet 172
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



REFER EXISTING DWG:
YN1M300439-CZA,
SH:29_5

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

1MYN691003-102(A3)REV01

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

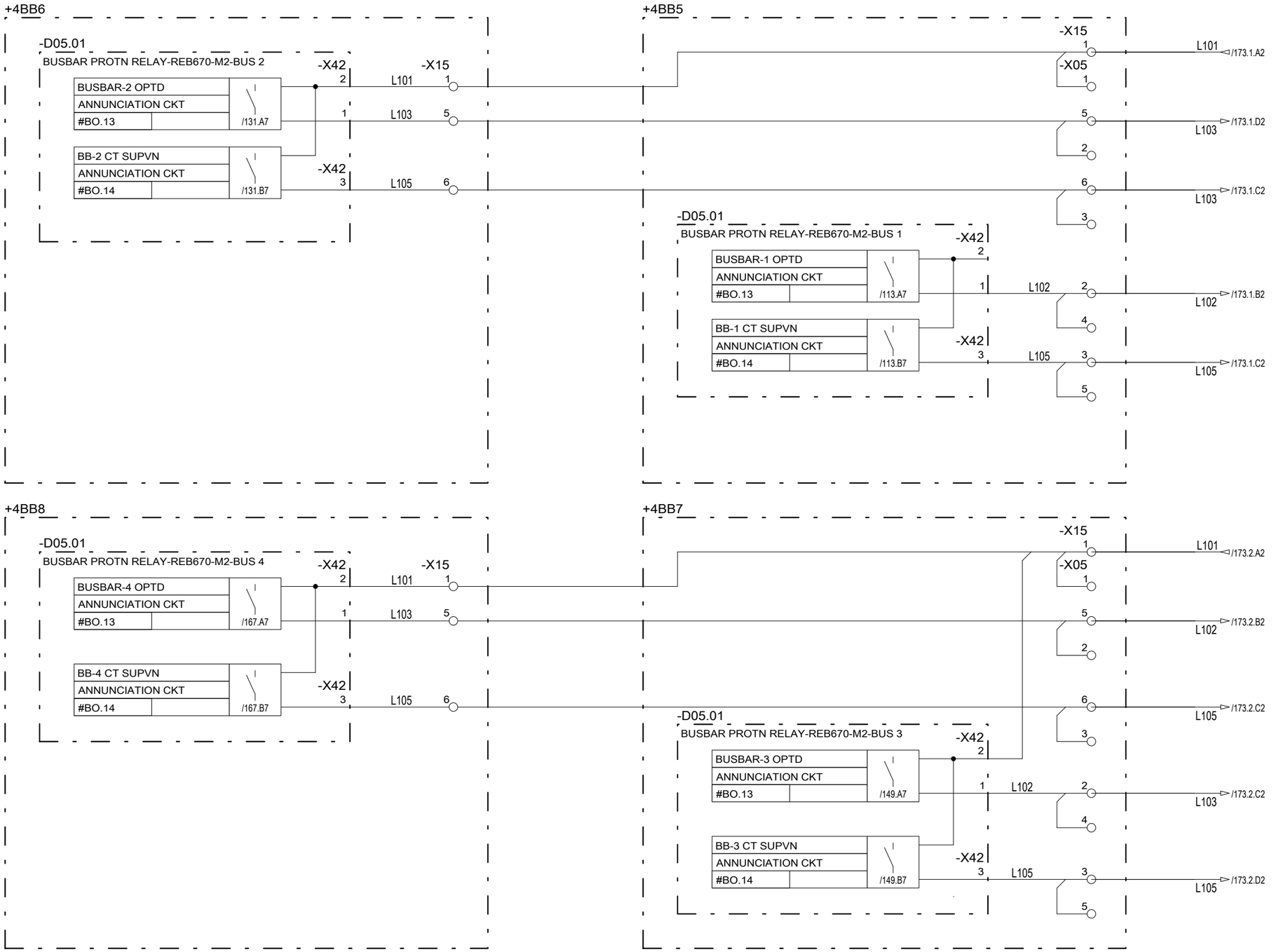
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUCIATION CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 172
n. sheet 173

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



REFER EXISTING DWG:
YN1M300439-CZA,
SH:054_5

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title	400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUCIATION CIRCUITS		
	HITACHI Hitachi Energy India Limited		
Doc. kind.	Circuit diagram	DCC	EFS
Resp. dept.	PG-GAS	Rev. ind.	01
Ref.Des.	=4R		
Language	en		
Sheet	173		
n. sheet	173.1		
Doc. no.	1MNS801837-CGCA		

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

-4RBB1/4RBB5

+CP
CONTROL PANEL

MAIN-1

/173.1.D1 #4329 +4BB1-D01.155.101:16

/172.A7 L101 +AN — X05 — 01 — L101 — -** — +VE

/173.A7 L101 +AN +4BB5.B.17-X15:1

/173.1.E1 +4BB2-D01.155.101:16 L104

/172.A7 L102 A — 02 — L102 — ** — BUS-1 MAIN-I/II B/B PROTN OPTD

/173.B7 +4BB5.B.17-X15:2 A L102

/172.B7 L103 B — 03 — L103 — ** — BUS-2 MAIN-I/II B/B PROTN OPTD

/173.B7 +4BB5.B.17-X15:6 B L103

/172.B7 L103A C — 04 — L103A — ** — BUS-1 MAIN-I/II CT SUPVN RELAY OPTD

/173.B7 +4BB5.B.17-X15:3 C L105

/172.C7 L105 D — 05 — L105 — ** — BUS-2 MAIN-I/II CT SUPVN RELAY OPTD

/173.A7 +4BB5.B.17-X15:5 D L103

/173.1.A2 #4329 -D01.155.101 16 17 -D01.155.101 16 17 — 06 — L104 — ** — BUS-1 MAIN-I/II BUS-2 MAIN-I/II BB PROTN. DC FAIL

/173.1.B2 L104 -D01.155.101 16 17 -D01.155.101 16 17 — 07 — ** — BUS-1/2 MAIN-II BB PROTN. DC FAIL

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

1MYN691003-102(A3)REV01

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

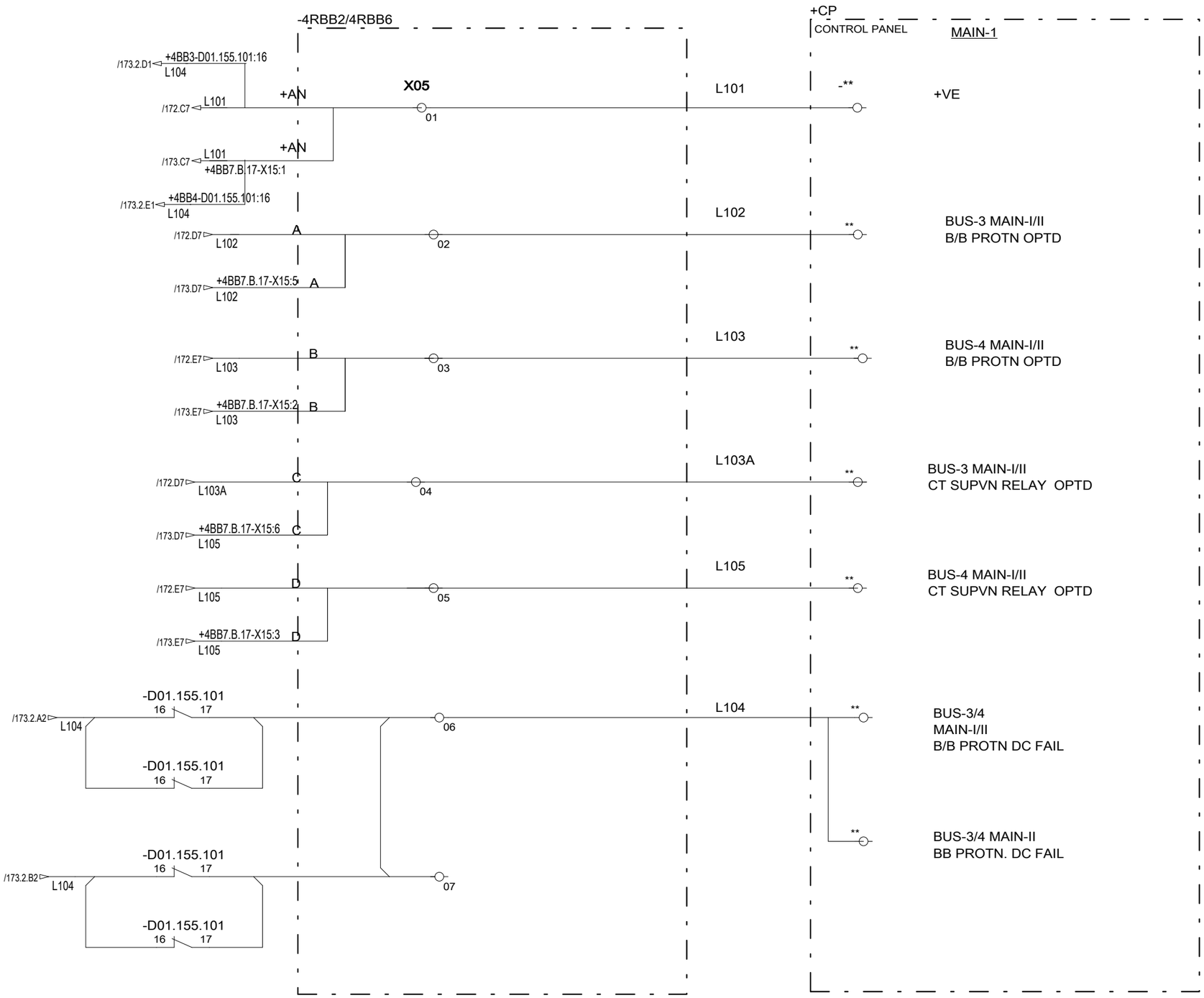
Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUNCIATOR CIRCUIT

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	173.1
		n. sheet	173.2

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.



Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title	400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUNCIATOR CIRCUIT		
HITACHI	Hitachi Energy India Limited		
Doc. kind.	Circuit diagram	DCC EFS	
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	173.2
		n. sheet	174
Ref.Des.	=4R		

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB1

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

BUSBAR-1 Rph OPTD	I	/41.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-1 Yph OPTD	I	/41.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-1 Bph OPTD	I	/42.E2
EVENT LOGGER CKT		
#BO.11		
BB-1 CT SUPVN	I	/42.E2
EVENT LOGGER CKT		
#BO.12		

-X16 1 → -X6 1 → ** **MAIN-1**

-X42 5 → L301 → 1 → ** BUSBAR-1 Rph. PROTN OPTD

-X42 4 → L302 → 2 → ** BUSBAR-1 Yph. PROTN OPTD

-X42 6 → L303 → 3 → ** BUSBAR-1 Bph. PROTN OPTD

-X61 17 → L304 → 4 → ** BUSBAR-1 CT SUPVN. RELAY OPTD

-X61 16 → L305 → 5 → ** BUSBAR-1 PROTN. OPTD.DC SUPPLY FAIL

-X61 18 → L306 → -D01.155.101 26 27 → 6 → ** BUSBAR-1 PROTN. OPTD.TRIP RELAY OPTD

L307 → -D01.143.301 26 27 → 7

+4BB2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BUSBAR-2 Rph OPTD	I	/59.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-2 Yph OPTD	I	/59.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-2 Bph OPTD	I	/60.B4
EVENT LOGGER CKT		
#BO.15		
BB-2 CT SUPVN	I	/60.C4
EVENT LOGGER CKT		
#BO.16		

-X16 1 → L301 → -X06 1 → ** **MAIN-1**

-X42 5 → L308 → 2 → ** BUSBAR-2 Rph. PROTN OPTD

-X42 6 → L309 → 3 → ** BUSBAR- 2 Yph. PROTN OPTD

X62 5 → L310 → 4 → ** BUSBAR-2 Bph. PROTN OPTD

X62 6 → L311 → 5 → ** BUSBAR-2 CT SUPVN. RELAY OPTD

-D01.155.101 26 27 L306 → 6 → ** BUSBAR-2 PROTN. OPTD.DC SUPPLY FAIL

-D01.143.301 26 27 L307 → 7 → ** BUSBAR-2 PROTN. OPTD.TRIP RELAY OPTD

REFER EXISTING DWG YN1M300439-CZA, SH:30

+4BB3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

BUSBAR-3 Rph OPTD	I	/77.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-3 Yph OPTD	I	/77.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-3 Bph OPTD	I	/78.B4
EVENT LOGGER CKT		
#BO.15		
BB-3 CT SUPVN	I	/78.B4
EVENT LOGGER CKT		
#BO.16		

-X16 1 → -X6 1 → ** **MAIN-1**

-X42 5 → L301 → 1 → ** BUSBAR-3 Rph. PROTN OPTD

-X42 4 → L302 → 2 → ** BUSBAR-3 Yph. PROTN OPTD

-X42 6 → L303 → 3 → ** BUSBAR-3 Bph. PROTN OPTD

-X62 5 → L304 → 4 → ** BUSBAR-3 CT SUPVN. RELAY OPTD

-X62 6 → L305 → 5 → ** BUSBAR-3 PROTN. OPTD.DC SUPPLY FAIL

-D01.155.101 26 27 L306 → 6 → ** BUSBAR-3 PROTN. OPTD.TRIP RELAY OPTD

L307 → -D01.143.301 26 27 → 7

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

BUSBAR-4 Rph OPTD	I	/95.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-4 Yph OPTD	I	/95.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-4 Bph OPTD	I	/96.B4
EVENT LOGGER CKT		
#BO.15		
BB-4 CT SUPVN	I	/96.B4
EVENT LOGGER CKT		
#BO.16		

-X16 1 → L301 → -X06 1 → ** **MAIN-1**

-X42 5 → L308 → 2 → ** BUSBAR-4 Rph. PROTN OPTD

-X42 6 → L309 → 3 → ** BUSBAR- 4 Yph. PROTN OPTD

-X62 5 → L310 → 4 → ** BUSBAR-4 Bph. PROTN OPTD

-X62 6 → L311 → 5 → ** BUSBAR-4 CT SUPVN. RELAY OPTD

-D01.155.101 26 27 L306 → 6 → ** BUSBAR-4 PROTN. OPTD.DC SUPPLY FAIL

-D01.143.301 26 27 L307 → 7 → ** BUSBAR-4 PROTN. OPTD.TRIP RELAY OPTD

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY EVENT LOGGER CIRCUIT

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
	DCC EFS		
Resp. dept.	PG-GAS	Rev. ind.	01
Language	en		
Sheet	174		
Doc. no.	1MNS801837-CGCA	n. sheet	175

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

BUSBAR-1 Rph OPTD	I	/113.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-1 Yph OPTD	I	/113.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-1 Bph OPTD	I	/114.E2
EVENT LOGGER CKT		
#BO.11		
BB-1 CT SUPVN	I	/114.E2
EVENT LOGGER CKT		
#BO.12		

-X42 5 L301 → +EL -X16 1 → -X06 1 **
-X42 4 L302 → +EL -X16 2 → -X06 2 ** BUSBAR-1 Rph. PROTN OPTD
-X42 6 L303 → +EL -X16 3 → -X06 3 ** BUSBAR-1 Yph. PROTN OPTD
-X61 17 / 16 L304 → +EL -X16 4 → -X06 4 ** BUSBAR-1 Bph. PROTN OPTD
-X61 18 L305 → +EL -X16 5 → -X06 5 ** BUSBAR-1 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → +EL -X16 6 → -X06 6 ** BUSBAR-1 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → +EL -X16 7 → -X06 7 ** BUSBAR-1 PROTN. OPTD.TRIP RELAY OPTD

MAIN-2

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

BUSBAR-2 Rph OPTD	I	/131.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-2 Yph OPTD	I	/131.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-2 Bph OPTD	I	/132.A4
EVENT LOGGER CKT		
#BO.13		
BB-2 CT SUPVN	I	/132.B4
EVENT LOGGER CKT		
#BO.14		

-X16 1 L301 → -X06 1 **
-X42 5 → -X16 1 L301 → -X06 1 ** MAIN-2
-X42 4 L308 → -X16 2 → -X06 2 ** BUSBAR-2 Rph. PROTN OPTD
-X42 6 L309 → -X16 3 → -X06 3 ** BUSBAR-2 Yph. PROTN OPTD
X62 2 / 1 L310 → -X16 4 → -X06 4 ** BUSBAR-2 Bph. PROTN OPTD
X62 3 L311 → -X16 5 → -X06 5 ** BUSBAR-2 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → -X16 6 → -X06 6 ** BUSBAR-2 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → -X16 7 → -X06 7 ** BUSBAR-2 PROTN. OPTD.TRIP RELAY OPTD

REFER EXISTING DWG
YN1M300439-CZA,
SH:55

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BUSBAR-3 Rph OPTD	I	/149.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-3 Yph OPTD	I	/149.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-3 Bph OPTD	I	/150.B4
EVENT LOGGER CKT		
#BO.15		
BB-3 CT SUPVN	I	/150.B4
EVENT LOGGER CKT		
#BO.16		

-X16 2 → -X06 1 **
-X42 5 L301 → -X16 2 → -X06 1 ** MAIN-2
-X42 4 L302 → -X16 2 → -X06 2 ** BUSBAR-3 Rph. PROTN OPTD
-X42 6 L303 → -X16 3 → -X06 3 ** BUSBAR-3 Yph. PROTN OPTD
-X62 5 / 4 L304 → -X16 4 → -X06 4 ** BUSBAR-3 Bph. PROTN OPTD
-X62 6 L305 → -X16 5 → -X06 5 ** BUSBAR-3 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → -X16 6 → -X06 6 ** BUSBAR-2 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → -X16 7 → -X06 7 ** BUSBAR-2 PROTN. OPTD.TRIP RELAY OPTD

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

BUSBAR-4 Rph OPTD	I	/167.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-4 Yph OPTD	I	/167.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-4 Bph OPTD	I	/168.B4
EVENT LOGGER CKT		
#BO.15		
BB-4 CT SUPVN	I	/168.B4
EVENT LOGGER CKT		
#BO.16		

-X16 1 L301 → -X06 1 **
-X42 5 → -X16 1 L301 → -X06 1 ** MAIN-2
-X42 4 L308 → -X16 2 → -X06 2 ** BUSBAR-4 Rph. PROTN OPTD
-X42 6 L309 → -X16 3 → -X06 3 ** BUSBAR-4 Yph. PROTN OPTD
-X62 5 / 4 L310 → -X16 4 → -X06 4 ** BUSBAR-4 Bph. PROTN OPTD
-X62 6 L311 → -X16 5 → -X06 5 ** BUSBAR-4 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → -X16 6 → -X06 6 ** BUSBAR-4 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → -X16 7 → -X06 7 ** BUSBAR-4 PROTN. OPTD.TRIP RELAY OPTD

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

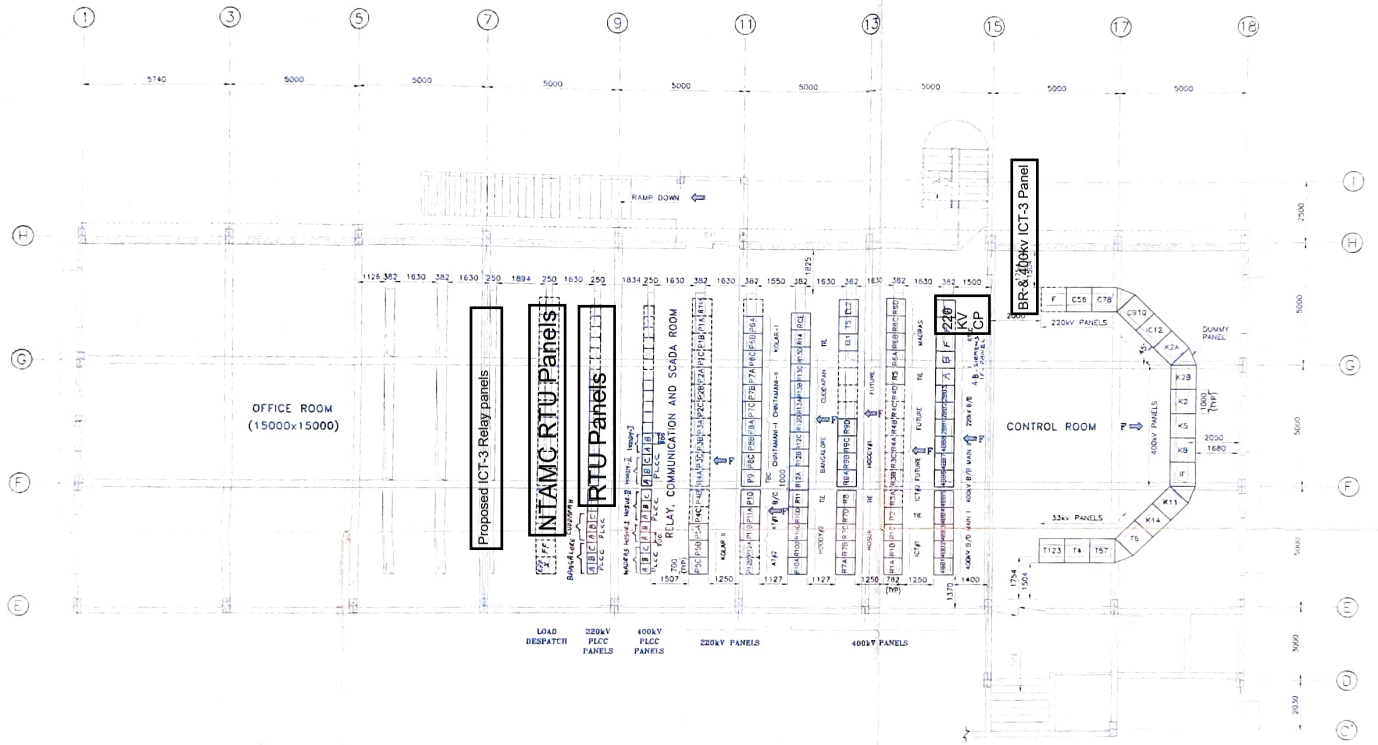
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY EVENT LOGGER CIRCUIT

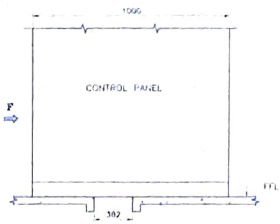
HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 175
n. sheet
Doc. no. 1MNS801837-CGCA

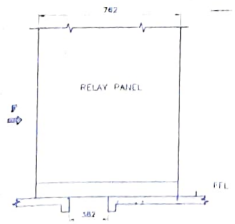
1MYN691003-102(A3)REV01



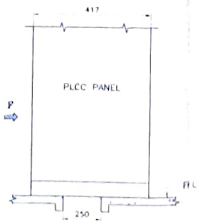
MEZZANINE FLOOR PLAN



TYPICAL MOUNTING DETAIL OF CONTROL PANEL
(NTS)



TYPICAL MOUNTING DETAIL OF RELAY PANEL
(NTS)



TYPICAL MOUNTING DETAIL OF PLCC PANEL
(NTS)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. PANEL DESIGNATION SHALL BE AS PER LEGEND GIVEN BELOW.

LEGEND:-

400kV LINE PROTECTION (4 PANELS) FOR 6TH BAY SIMILARLY FOR OTHERS

- P6A – MAIN-1 & OVER VOLTAGE
- P6B – MAIN-2
- P6C – DISTURBANCE RECORDER
- P6D – CB AUX, A/R & LBB

400kV AT#1 PROTECTION (3 PANELS)

- P1A – HV DIFF. PROTECTION & BACKUP PROTECTION
- P1B – TRANSFORMER REF & AUX. PROTECTION
- P1C – CB AUX & LBB

220kV SIDE AT#1 PROTECTION (2 PANELS)

- P11A – V/F, BACKUP PROTECTION
- P11B – CB AUX & LBB

220kV LINE PROTECTION (1 PANELS) FOR 7TH BAY SIMILARLY FOR OTHERS

- P7A – MAIN-1 & DISTURBANCE RECORDER
- P7B – MAIN-2
- P7C – CB AUX, A/R & LBB

400kV BUS BAR PROTECTION (3 PANELS)

- 4881 TO 4884 – MAIN-I FOR BUS I,II,III & IV RESPECTIVELY
- 4885 TO 4888 – MAIN-II FOR BUS I,II,III & IV RESPECTIVELY

220kV BUS BAR PROTECTION (1 PANELS)

- 2881 TO 2883 – BUS BAR PROTECTION FOR BUS I & II

MISCELLANEOUS PANELS

- EL1 – 400kV E/L
- EL2 – 220kV E/L
- TS – TIME SYNCHRONISING
- RCE – 400kV VOLTAGE & FREQUENCY RECORDERS FOR BUS I,II,III & IV.
- RTCC – REMOTE TAP CHANGER
- I – SIEMENS INTERFACE PANEL (2 Nos)
- FP – FIRE ALARM PANEL

400kV CONTROL PANELS

- K2A, K2B, K2 – CONTROL PANEL FOR BAY 1,2/3 (AT#1-TIE-AT#2 (F))
- K5 – CONTROL PANEL FOR BAY 4/5/6 (FUTURE-TIE-MADRAS)
- K8 – CONTROL PANEL FOR BAY 7/8/9 (HOSUR-TIE-HOODY-I)
- K11 – CONTROL PANEL FOR BAY 10/11/12 (HOODY-II-TIE-BANGALORE)
- K14 – CONTROL PANEL FOR BAY 13/14/15 (CUDDAPAH-TIE-FUTURE)
- IF – INTERFACE PANEL (BUS SECTIONALISER BETWEEN BUS I,II & II,IV)

220kV CONTROL PANELS

- C56 – CONTROL PANEL FOR BAY 5/6 (KOLAR-II & KOLAR-I)
- C78 – CONTROL PANEL FOR BAY 7/8 (CHINTAMANI-II & CHINTAMANI-I)
- C910 – CONTROL PANEL FOR BAY 9,10 (TBC & SC)
- IC12 – CONTROL PANEL FOR BAY 11/12 (K#1 & K#2)
- F – FUTURE

33kV CONTROL AND RELAY PANELS

- T123 – CONTROL & RELAY PANEL FOR BAY 1/2/3 (AUX TRAFO, HVDC#1 & HVDC#2)
- T4 – CONTROL & RELAY PANEL FOR BAY 4 (TERTIARY OF AT)
- T57 – CONTROL & RELAY PANEL FOR BAY 5/7 (HVDC#2 & BUS SECTION)
- T6 – CONTROL & RELAY PANEL FOR BAY 6 (SEB FDR & 5MVA TRAFO)

REFERENCE DRAWINGS:-

SL.No.	DRAWING No.	TITLE
1.	CG/973/502	CONTROL ROOM BUILDING MEZZANINE FLOOR PLAN
2.	CG/973/001	SINGLE LINE DIAGRAM OF 400/220/33kV KOLAR S/S
3.	CG/973/002	PROTECTION SINGLE LINE DIAGRAM OF 400/220/33kV S/S

AS BUILT

REV. No.	DESCRIPTION	APPROVD	DATE
R6	AS BUILT		27.11.2002
R5	EVENT LOGGER PANELS RELOCATED		28.02.2002
R4	REVISED BASED ON PGCIL COMMENTS DATED 08/02/2002		14.02.2002
R3	DRAWING REVISED		04.02.2002
R2	REVISED BASED ON PGCIL COMMENTS DATED 02/02/2001 AND IN LINE WITH CIVIL CONSTRUCTION DRAWING		31.03.2001
R1	REVISED BASED ON DISCUSSIONS WITH PGCIL ON 11/01/2001		23.01.2001

PROJECT: EAST-SOUTH INTERCONNECTOR-II
400/220/33kV KOLAR S/S (PKG. A)

CONTRACT No:

TITLE: EQUIPMENT LAYOUT OF CONTROL ROOM BUILDING -MEZZANINE FLOOR PLAN

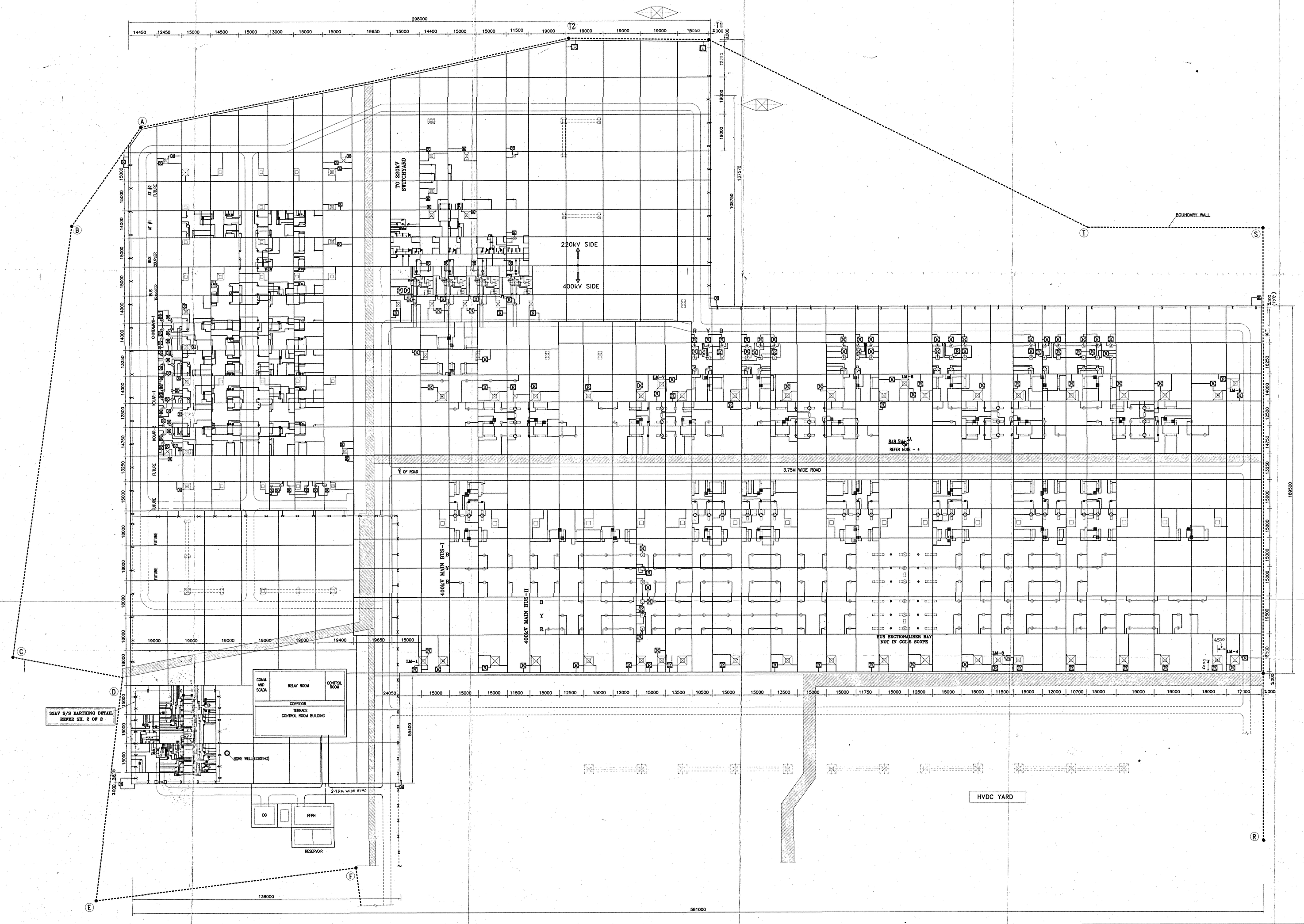
Crompton Greaves
ENGINEERING PROJECTS DIVISION - CHENNAI

CUSTOMER: POWER GRID CORPORATION OF INDIA LTD.
(A GOVERNMENT OF INDIA ENTERPRISE)

DRAWN	S.NATRAJ	DATE	30.10.2000
CHECKED		SCALE	1:100
APPROVED			
PASSED		SHEET No.	1 OF 1

DRG. No. CG/973/101 REV. R6

AT#2 BAY(F)	FUTURE		MADRAS	HOSUR	HOODY-1	HOODY-2	BANGALORE	CUDDAPAH		FUTURE



NOTES:

1. EARTHING CONNECTIONS OF EQUIPMENTS SHOWN ARE DIAGRAMATIC ONLY. EXACT LOCATIONS OF EQUIPMENTS EARTHING CONNECTION LEADS, EARTH ELECTRODES MAY BE CHANGED TO SUIT SITE CONDITIONS.
2. EARTHING LEADS FROM EQUIPMENTS / STRUCTURES SHALL BE CONNECTED TO DIFFERENT CONDUCTORS OF MAIN EARTHING GRID.
3. DEPTH OF LAYING OF MAIN EARTHING CONDUCTOR SHALL BE 800mm BELOW THE FINISHED GROUND LEVEL.
4. EARTHING CONNECTIONS WITH EQUIPMENT EARTHING PADS SHALL BE BOLTED TYPE AND BELOW GROUND LEVEL CONNECTIONS SHALL BE WELDED TYPE. FOR RUST PROTECTIONS WELDS SHOULD BE TREATED WITH RED LEAD & AFTERWARDS COATED WITH BITUMEN COMPOUND TO PREVENT CORROSION.
5. ALL BELOW GROUND LEVEL CONNECTIONS SHALL BE ELECTRIC ARC WELDING. ALL WELDED JOINTS SHALL BE ALLOWED TO COOL DOWN GRADUALLY TO ATMOSPHERIC TEMPERATURE BEFORE PUTTING ANY LOAD ON IT.
6. WHEREVER EARTHING CONDUCTORS CROSSES CABLE TRENCHES, PIPES, ETC., IT SHALL BE LAID 300mm BELOW THEM AND SHALL BE REROUTED IN CASE IT FOULS WITH EQUIPMENT STRUCTURE FOUNDATION.
7. EARTHING CONDUCTOR CROSSING THE ROAD SHALL BE LAID 300mm BELOW ROAD.
8. AUXILIARY EARTH MAT SIZE 1.5m x 1.5m SHALL BE LAID BELOW THE MAIN SWITCH & EARTH SWITCH OPERATING HANDLES OF ISOLATORS AT A DEPTH OF 300mm BELOW THE FINISHED GROUND LEVEL.
9. AUX. EARTHMAT FOR ISOLATOR OPERATING MECHANISM SHOWN ARE INDICATIVE ONLY EXACT LOCATION SHALL BE AS PER REFERENCE DRAWINGS BELOW.
10. THE EARTHING OF INDIVIDUAL EQUIPMENTS / TOWERS / LMs SHALL BE DONE AS PER THE APPROVED EARTHING DETAIL DRAWING.
11. ALTERNATE FENCE POST SHALL BE CONNECTED TO EARTH MAT.
12. DISTANCES SHOWN FOR EARTHING RODS MAY BE ALTERED TO SUIT SITE CONDITIONS HOWEVER THE SPACING SHALL NOT EXCEED 20M AND THE TOTAL NO. OF RODS (LONGITUDINAL AND TRANSVERSE DIRECTION) SHALL BE MAINTAINED AS SHOWN.

LEGEND:

- MAIN EARTHING & RISER CONDUCTOR (40mm ø MS ROD)
- AUXILIARY EARTH MAT (40mm ø MS ROD)
- ROD EARTH ELECTRODE
- PIPE EARTH ELECTRODE

REFERENCE DRAWINGS

Sl.No.	DRAWING DESCRIPTION	DRAWING No.
1	GENERAL ARRANGEMENT OF 400/220/33kV KOLAR SUBSTATION	CG/973/005
2	400/220/33kV KOLAR SUBSTATION LAYOUT – PLAN	CG/973/003
3	400/220/33kV KOLAR SUBSTATION LAYOUT – SECTIONS	CG/973/004
4	GENERAL NOTES ON EARTHING	CG/973/009
5	RISER DETAILS	CG/973/010
6	DETAIL OF LAP AND CROSS JOINTS	CG/973/011
7	DETAIL OF AUXILIARY EARTH MAT FOR ISOLATOR	CG/973/012
8	DETAIL OF PIPE EARTH ELECTRODE	CG/973/013
9	DETAILS OF ROD ELECTRODE	CG/973/014
10	EARTHING DETAIL OF 167MVA AUTO TRAFO.	CG/973/015
11	EARTHING DETAIL OF 400kV CIRCUIT BREAKER	CG/973/016
12	EARTHING DETAIL OF 400kV ISOLATOR WITH DOUBLE EARTH SWITCH	CG/973/017
13	EARTHING DETAIL OF 400kV ISOLATOR WITH SINGLE EARTH SWITCH	CG/973/018
14	EARTHING DETAIL OF 400kV CURRENT TRANSFORMER	CG/973/019
15	EARTHING DETAIL OF 400kV CAP. VOLTAGE TRANSFORMER	CG/973/020
16	EARTHING DETAIL OF 396kV LIGHTNING ARRESTER	CG/973/021
17	EARTHING DETAIL OF 400kV WAVE TRAP	CG/973/022
18	EARTHING DETAIL OF 400kV BUS PT INSULATOR	CG/973/023
19	EARTHING DETAIL OF 220kV CIRCUIT BREAKER	CG/973/024
20	EARTHING DETAIL OF 220kV ISOLATOR WITH SINGLE EARTH SWITCH	CG/973/025
21	EARTHING DETAIL OF 220kV ISOLATOR WITH DOUBLE EARTH SWITCH	CG/973/026
22	EARTHING DETAIL OF 220kV TWIDDA ISOLATOR	CG/973/027
23	EARTHING DETAIL OF 220kV CURRENT TRANSFORMER	CG/973/028
24	EARTHING DETAIL OF 220kV CAP. VOLTAGE TRANSFORMER	CG/973/029
25	EARTHING DETAIL OF 216kV LIGHTNING ARRESTER	CG/973/030
26	EARTHING DETAIL OF 220kV WAVE TRAP	CG/973/031
27	EARTHING DETAIL OF 220kV BUS PT INSULATOR	CG/973/032
28	EARTHING DETAIL OF LIGHTING CUM LIGHTNING	CG/973/033
29	EARTHING DETAIL OF TOWER WITH PEAK	CG/973/034
30	EARTHING DETAIL OF TOWER WITHOUT PEAK	CG/973/035
31	EARTHING DETAIL OF BAY MARSHALING KIOSK	CG/973/036
32	EARTHING DETAIL OF CABLE TRENCH	CG/973/038
33	EARTHING DETAIL OF GATE & FENCE	CG/973/039
34	EARTHING DETAIL OF 1000/630MVA TRANSFORMER	CG/973/040
35	EARTHING DETAIL OF 33kV CIRCUIT BREAKER	CG/973/041
36	EARTHING DETAIL OF 33kV ISO. WITH ONE E/S	CG/973/042
37	EARTHING DETAIL OF 33kV ISO. WITH TWO E/S	CG/973/043
38	EARTHING DETAIL OF 33kV CT	CG/973/044
39	EARTHING DETAIL OF 33kV PT	CG/973/045
40	EARTHING DETAIL OF 33kV HORN GAP FUSE	CG/973/046
41	EARTHING DETAIL OF 33kV LIGHTNING ARRESTER	CG/973/047
42	EARTHING DETAIL OF 33kV BUS POST INSULATOR	CG/973/048
43	EARTHING DETAIL OF STREET LIGHTING POLE	CG/973/049

AS BUILT

PROJECT: EAST-SOUTH INTERCONNECTOR-II
400/220/33kV KOLAR S/S (PKG. A)

CONTRACT No:

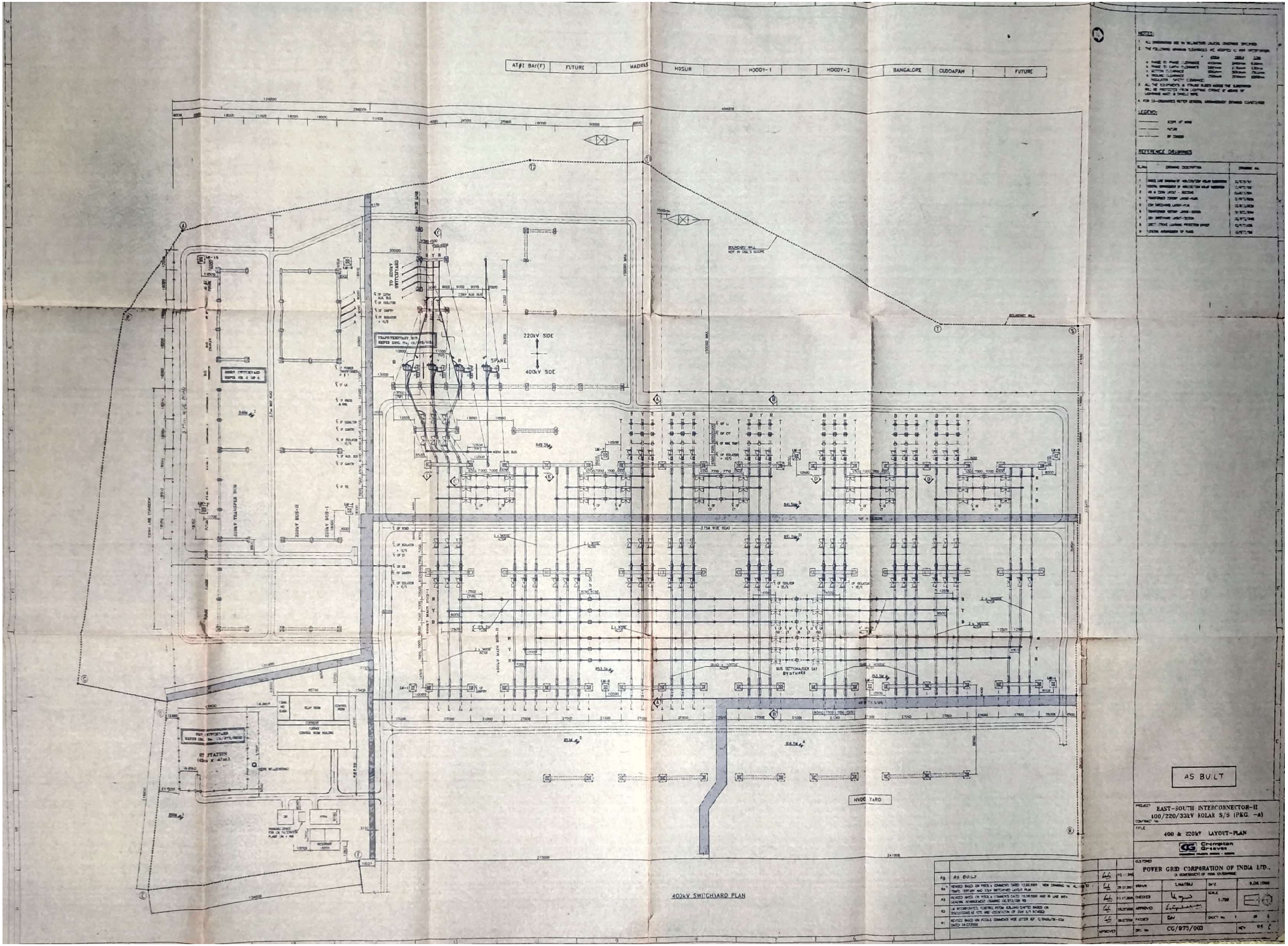
TITLE: EARTHING LAYOUT

Crompton Greaves
ENGINEERING PROJECTS DIVISION – CHENNAI

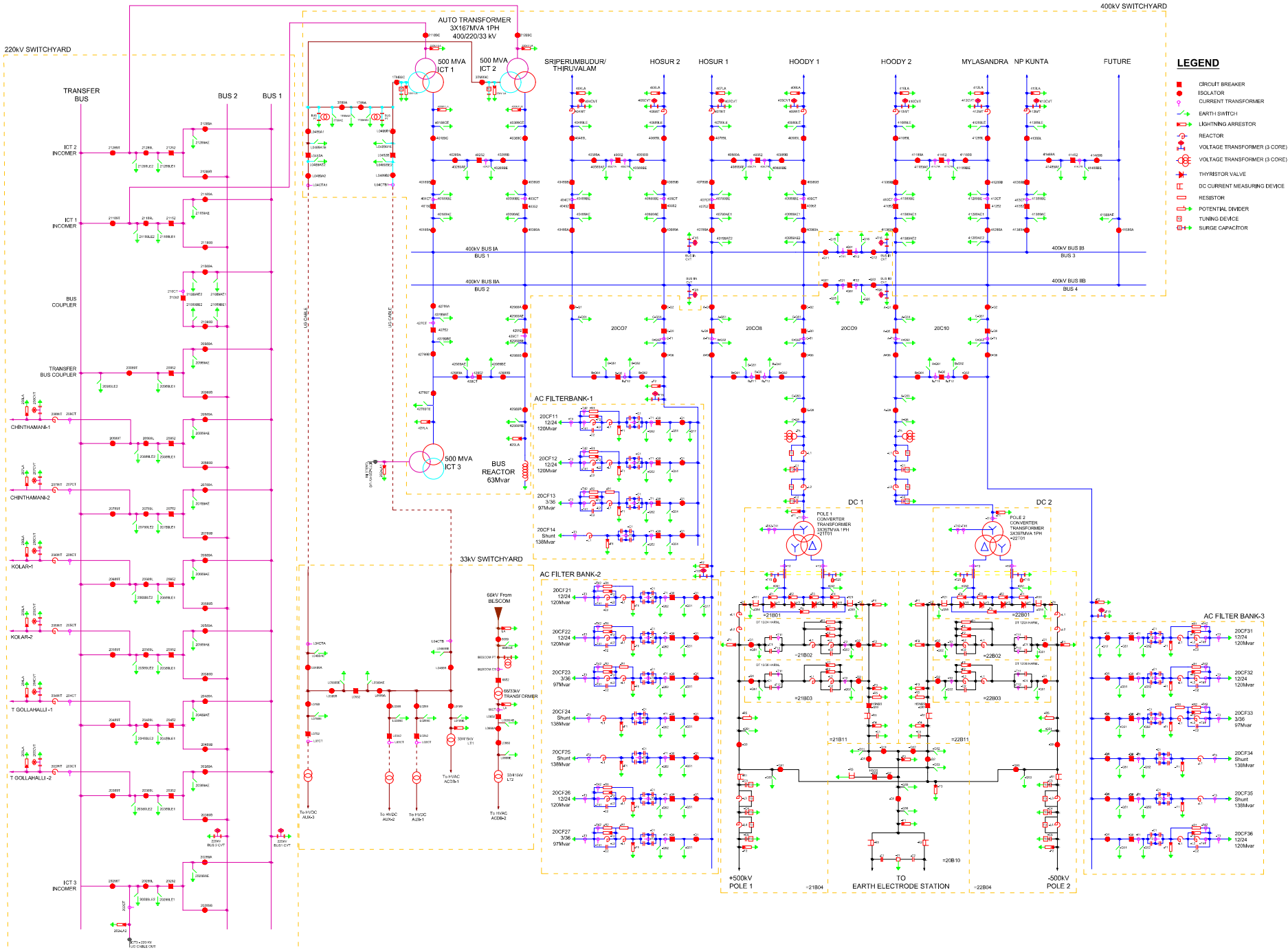
CUSTOMER: POWER GRID CORPORATION OF INDIA LTD.,
(A GOVERNMENT OF INDIA ENTERPRISE)

			DRAWN	S.NATRAJ	DATE	29.12.2000
			CHECKED		SCALE	1:700
R2	AS BUILT	02.01.2003	APPROVED			
R1	REVISED BASED ON PGCIL COMMENTS DATED 11.01.2001	03.04.2001	PASSED		SHEET No.	1 OF 2
		APPROVED	DRG. No.	CG/973/007	REV.	R2

1189 X 841 - A0 CAD FILE/LOC :- HD2B/C/PGCIL/EXCEL/973/R1/973EAR.DWG


AT#1 BAY(F)
FUTURE
MADRAS
HOSUR
HOODY-1
HOODY-2
BANGALORE
CUDDAPAH
FUTURE
220kV SIDE
400kV SIDE
SPARE
400kV SWITCHYARD PLAN
HVDC YARD
AS BUILT
EAST-SOUTH INTERCONNECTOR-II
400/220/33kV KOLAR S/S (P&G. -A)
400 & 220kV LAYOUT-PLAN
POWER GRID CORPORATION OF INDIA LTD.
CG/973/003

POWERGRID CORPORATION OF INDIA LIMITED
2500 MW, ±500kV HVDC TERMINAL & 400/220kV HVAC STATION KOLAR

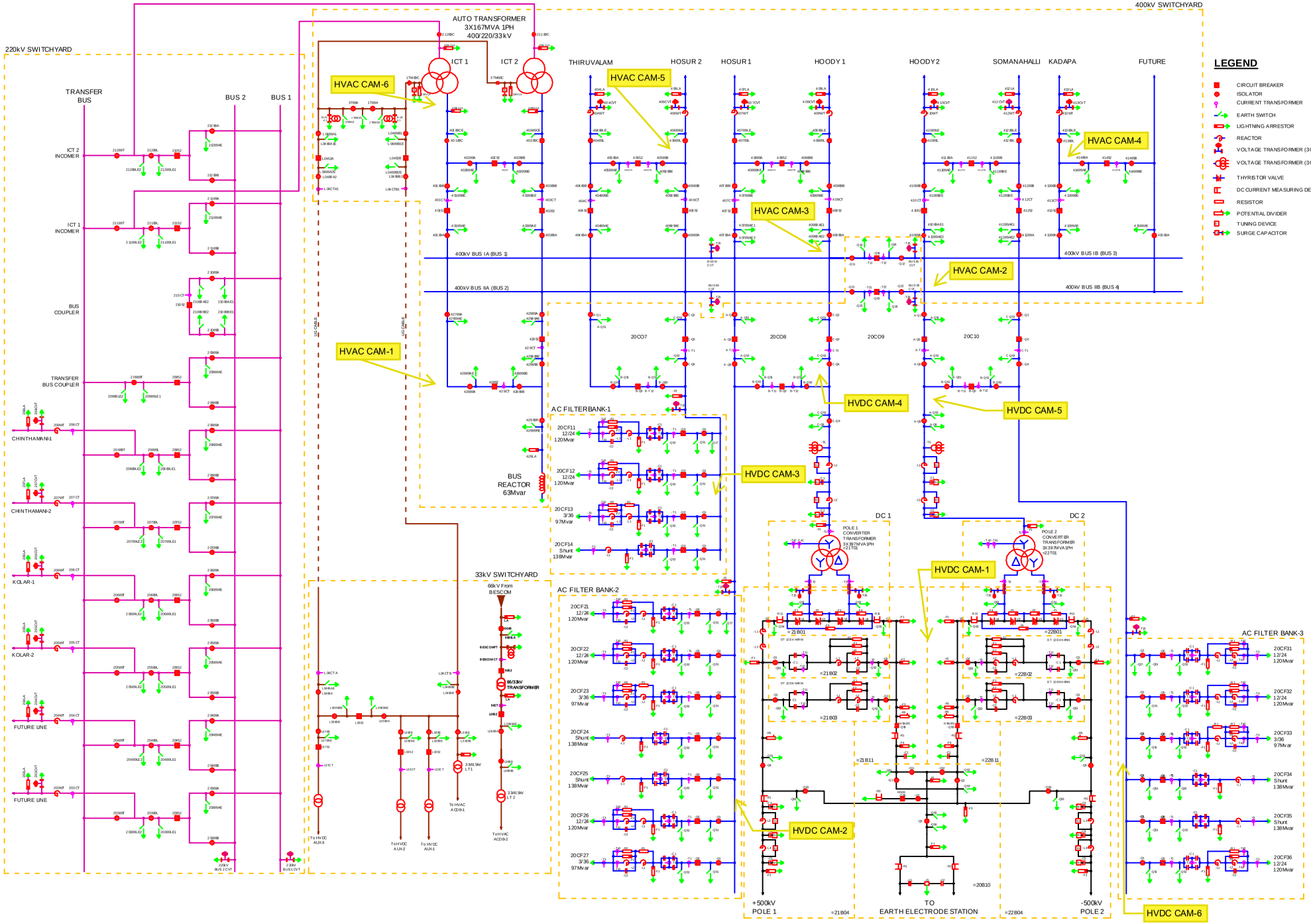


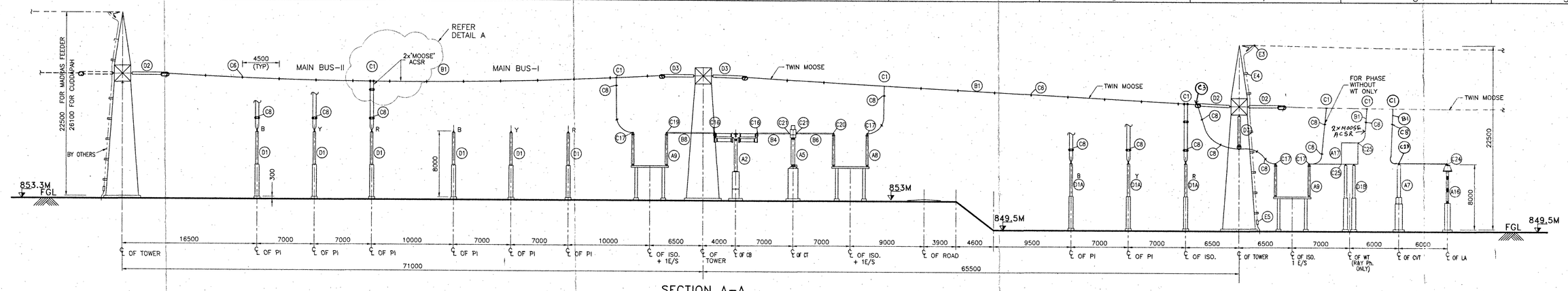
drwng No: PGCIL/kolar/(

POWERGRID CORPORATION OF INDIA LIMITED

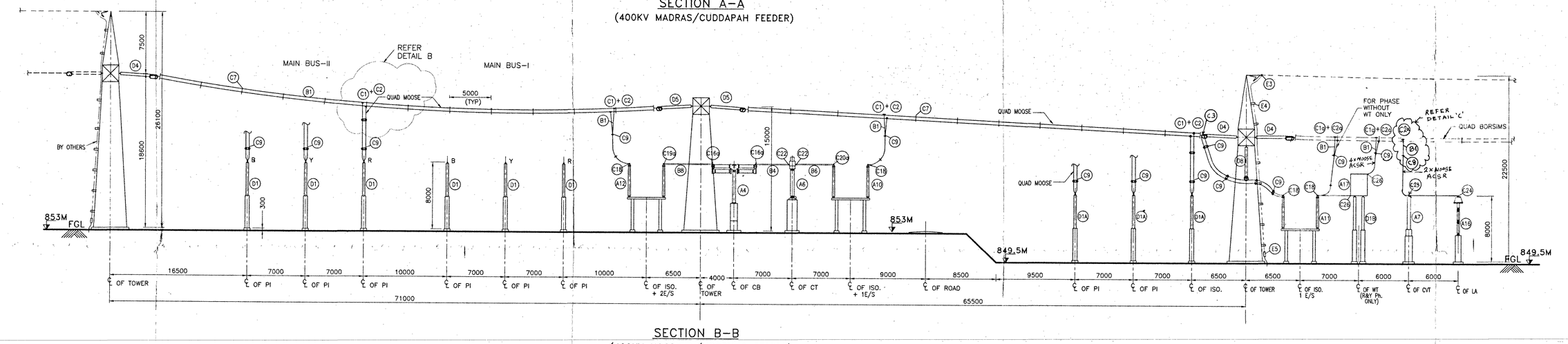
2500 MW, ±500kV HVDC TERMINAL & 400/220kV HVAC STATION KOLAR

drwng No: PGCIL/kolar/ 02

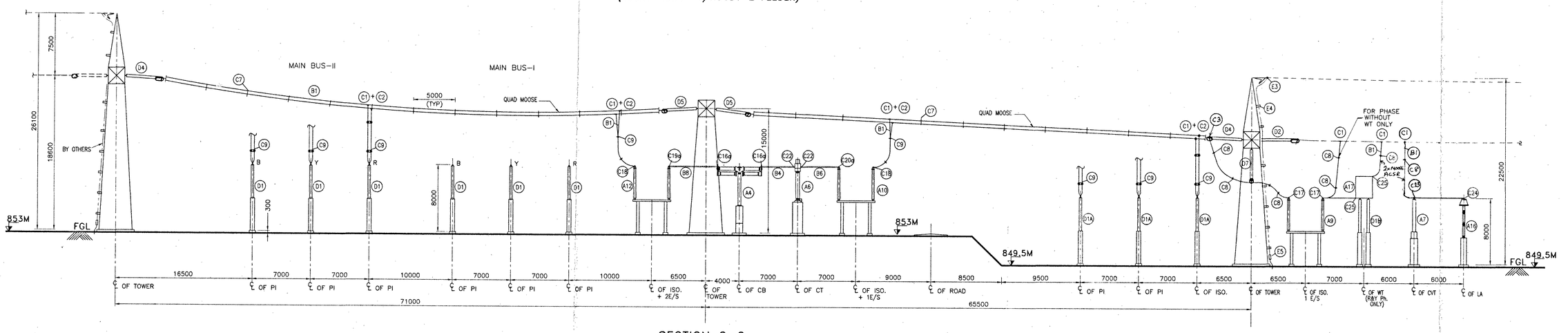




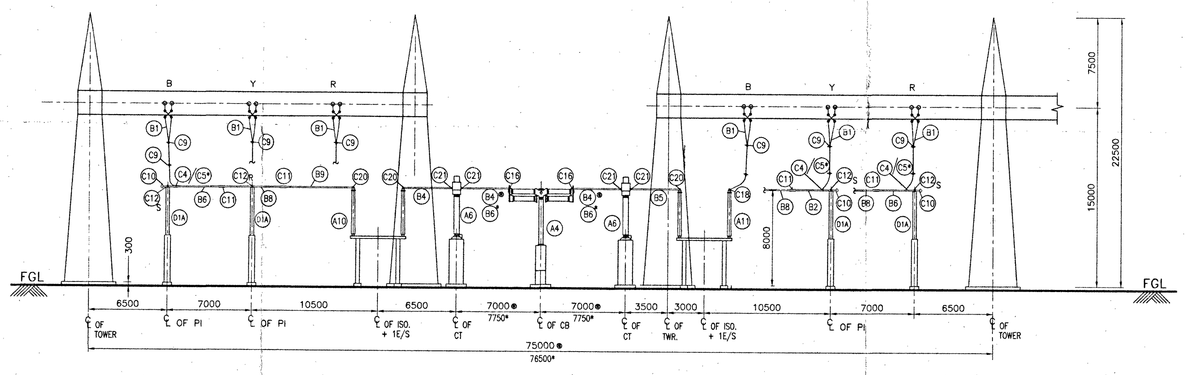
SECTION A-A
(400KV MADRAS/CUDDAPAH FEEDER)



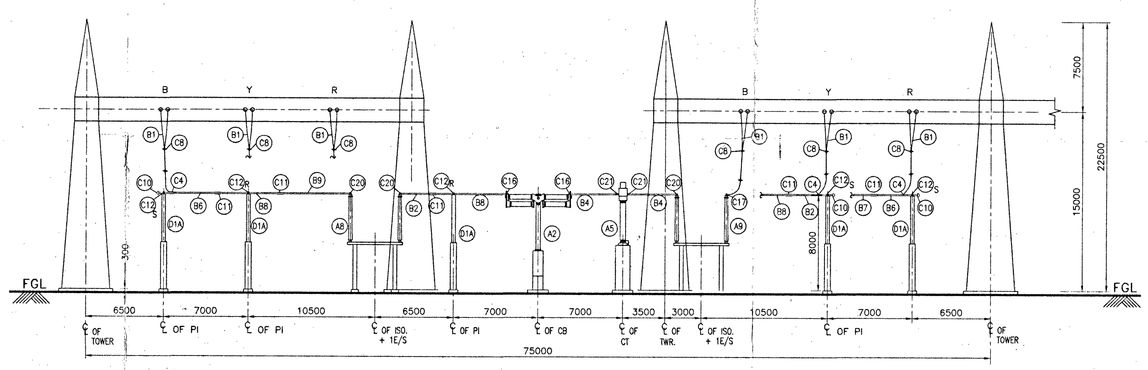
SECTION B-B
(400KV HOODY-1/HOODY-2 FEEDER)



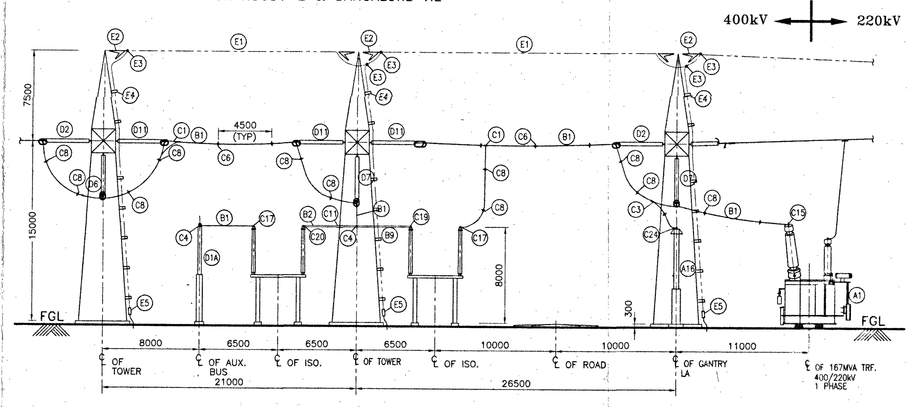
SECTION C-C
(400KV HOSUR/BANGALORE FEEDER)



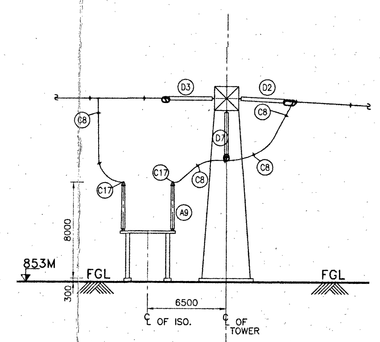
SECTION D-D
(400KV BUS TIE - 4 x 'MOOSE' ACSR)
* - FOR HOSUR & HOODY-1 TIE
⊙ - FOR HOODY-2 & BANGALORE TIE



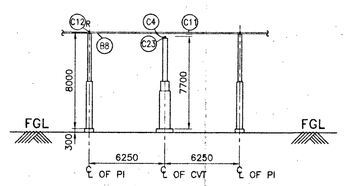
SECTION E-E
(400KV BUS TIE - 2 x 'MOOSE' ACSR)



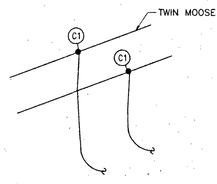
SECTION F-F
(400/220KV AUTO TRANSFORMER#1)



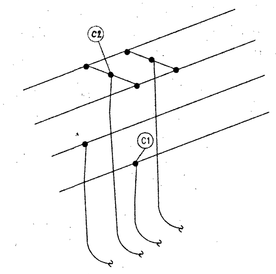
SECTION G-G



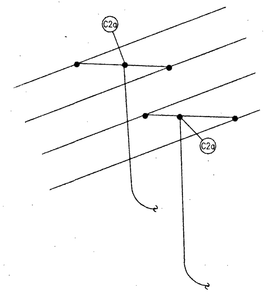
SECTION H-H
BUS CVT



TWIN TO TWIN CONNECTION
DETAIL A



QUAD TO QUAD CONNECTION
DETAIL B



QUAD TO TWIN CONNECTION
DETAIL C

NOTE:-

1. FOR NOTE & LEGEND REFER SHEET 1

AS BUILT

PROJECT: EAST-SOUTH INTERCONNECTOR-II 400/220/33kV KOLAR S/S (PKG.A)

CONTRACT No.:

TITLE: ERECTION KEY DIAGRAM 400kV SWITCHYARD

Crompton Greaves
ENGINEERING PROJECTS DIVISION - CHENNAI

CUSTOMER: POWER GRID CORPORATION OF INDIA LTD.,
(A GOVERNMENT OF INDIA ENTERPRISE)

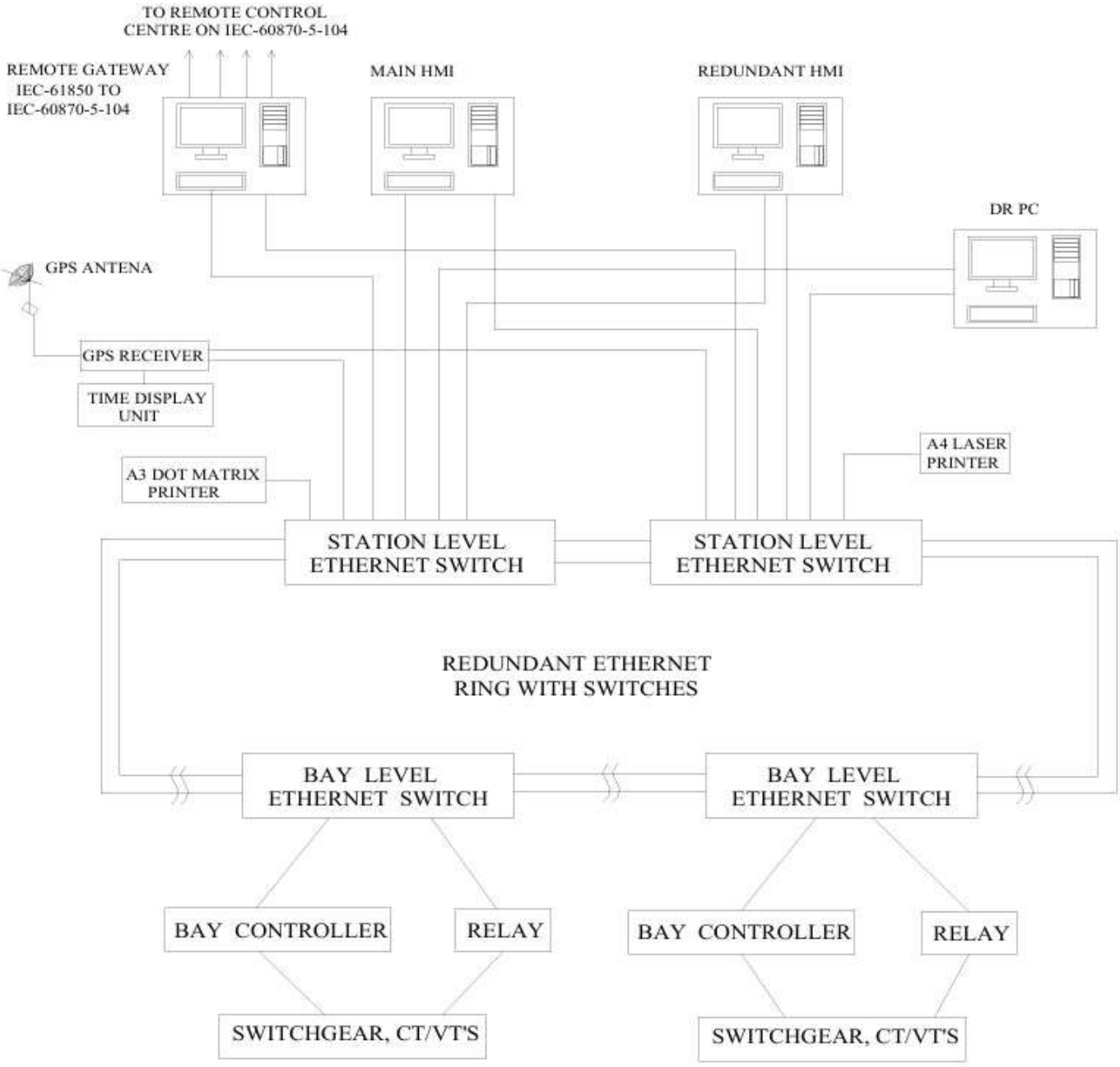
REV. No.	DESCRIPTION	APPROVED	DATE
R3	AS BUILT		02.01.2003
R2	REVISED BASED ON PGCIL'S COMMENTS DATED 19.07.01		17.08.2001
R1	REVISED BASED ON PGCIL'S COMMENTS DATED 15.06.2001		30.06.2001

DRAWN: K.MANIMEKALAI — DATE: 21.02.2001
CHECKED — SCALE: 1:250
APPROVED — SHEET No. 2 OF 2
PASSED
DRG. No. CG/973/072 — REV. R3

1188 X 841 - A0 CAD FILE/LOC. :- HD-28/D/PGCIL/EXCEL/400KV/R2/973EK0728.DWG

Drawing: KPTCL/01

TYPICAL ARCHITECTURAL DRAWING OF SUB-STATION AUTOMATION SYSTEM



© 2023 Hitachi Energy. All rights reserved.

CUSTOMER	:	POWER GRID CORPORATION OF INDIA LTD.
CUSTOMER REF. PO.NO	:	GEM/2022/B/2635950 Dated.17.03.2023
HE REF.NO	:	3100137898 , IN-56323017
SUBSTATION	:	400/220kV KOLAR SUBSTATION
EQUIPMENT	:	400kV BUSBAR PROTECTION RETROFITTING
DRAWING REF.	:	General Arrangement : 1MNS801837-AGCA
		Schematic Drawings : 1MNS801837-CGCA
STANDARD BAY REF.	:	=4R

IN CONTINUATION WITH EXISTING SCHEME YN1M300439-CZA

AUX. D.C. VOLTAGE : 220VDC
AUX. A.C. VOLTAGE : 230VAC

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY
Title page

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 1
No.sheets 161
Doc. no. 1MNS801837-AGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
1	2	RETROFIT OF REB670 RELAY	TITLE PAGE	01	REVISED AS PER CUSTOMER COMMENTS
2	3	LIST OF CONTENTS	1 - 74	01	REVISED AS PER CUSTOMER COMMENTS
3	4	LIST OF CONTENTS	75 - 132	01	REVISED AS PER CUSTOMER COMMENTS
4	21	LIST OF CONTENTS	133 - 175	01	REVISED AS PER CUSTOMER COMMENTS
21	22	LIST OF SYMBOLS	LIST OF SYMBOLS	01	REVISED AS PER CUSTOMER COMMENTS
22	23	RETROFIT OF REB670 RELAY	SLD	01	REVISED AS PER CUSTOMER COMMENTS
23	24	RETROFIT OF REB670 RELAY	SLD	01	REVISED AS PER CUSTOMER COMMENTS
24	25	RETROFIT OF REB670 RELAY	SLD	01	REVISED AS PER CUSTOMER COMMENTS
25	26	RETROFIT OF REB670 RELAY	BB & LBB OPTD LOGIC	01	REVISED AS PER CUSTOMER COMMENTS
26	27	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
27	28	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
28	29	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
29	30	RETROFIT OF REB670 RELAY	M1-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
30	31	RETROFIT OF REB670 RELAY	M1-BUS 1 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
31	32	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
32	33	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
33	34	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
34	35	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
35	36	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
36	37	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
37	38	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
38	39	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
39	40	RETROFIT OF REB670 RELAY	M1-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
40	41	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
41	42	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
42	43	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
43	44	RETROFIT OF REB670 RELAY	M1-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
44	45	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
45	46	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
46	47	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
47	48	RETROFIT OF REB670 RELAY	M1-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
48	49	RETROFIT OF REB670 RELAY	M1-BUS 2 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
49	50	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
50	51	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
51	52	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
52	53	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
53	54	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
54	55	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
55	56	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
56	57	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
57	58	RETROFIT OF REB670 RELAY	M1-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
58	59	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
59	60	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
60	61	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
61	62	RETROFIT OF REB670 RELAY	M1-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
62	63	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
63	64	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
64	65	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
65	66	RETROFIT OF REB670 RELAY	M1-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
66	67	RETROFIT OF REB670 RELAY	M1-BUS 3 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
67	68	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
68	69	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
69	70	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
70	71	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
71	72	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
72	73	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
73	74	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
74	75	RETROFIT OF REB670 RELAY	M1-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS

Based on 3100135063

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
LIST OF CONTENTS

HITACHI Hitachi Energy India Limited

Doc. kind. LIST OF CONTENTS
DCC EAB
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-AGCA
Sheet 2
n. sheet 3

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
75	76	M1-BUS 3 BINARY OUTPUTS	M1-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
76	77	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
77	78	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
78	79	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
79	80	RETROFIT OF REB670 RELAY	M1-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
80	81	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
81	82	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
82	83	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
83	84	RETROFIT OF REB670 RELAY	M1-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
84	85	RETROFIT OF REB670 RELAY	M1-BUS 4 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
85	86	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
86	87	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
87	88	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
88	89	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
89	90	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
90	91	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
91	92	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
92	93	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
93	94	RETROFIT OF REB670 RELAY	M1-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
94	95	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
95	96	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
96	97	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
97	98	RETROFIT OF REB670 RELAY	M1-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
98	99	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
99	100	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
100	101	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
101	102	RETROFIT OF REB670 RELAY	M2-BUS 1 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
102	103	RETROFIT OF REB670 RELAY	M2-BUS 1 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
103	104	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
104	105	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
105	106	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
106	107	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
107	108	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
108	109	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
109	110	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
110	111	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
111	112	RETROFIT OF REB670 RELAY	M2-BUS 1 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
112	113	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
113	114	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
114	115	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
115	116	RETROFIT OF REB670 RELAY	M2-BUS 1 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
116	117	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
117	118	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
118	119	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
119	120	RETROFIT OF REB670 RELAY	M2-BUS 2 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
120	121	RETROFIT OF REB670 RELAY	M2-BUS 2 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
121	122	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
122	123	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
123	124	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
124	125	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
125	126	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
126	127	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
127	128	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
128	129	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
129	130	RETROFIT OF REB670 RELAY	M2-BUS 2 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
130	131	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
131	132	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
132	133	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS

Based on 3100135063

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
LIST OF CONTENTS

HITACHI Hitachi Energy India Limited

Doc. kind. LIST OF CONTENTS
DCC EAB
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-AGCA
Sheet 3
n. sheet 4

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
133	134	RETROFIT OF REB670 RELAY	M2-BUS 2 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
134	135	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
135	136	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
136	137	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
137	138	RETROFIT OF REB670 RELAY	M2-BUS 3 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
138	139	RETROFIT OF REB670 RELAY	M2-BUS 3 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
139	140	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
140	141	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
141	142	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
142	143	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
143	144	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
144	145	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
145	146	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
146	147	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
147	148	RETROFIT OF REB670 RELAY	M2-BUS 3 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
148	149	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
149	150	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
150	151	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
151	152	RETROFIT OF REB670 RELAY	M2-BUS 3 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
152	153	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
153	154	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
154	155	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
155	156	RETROFIT OF REB670 RELAY	M2-BUS 4 CT CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
156	157	RETROFIT OF REB670 RELAY	M2-BUS 4 PSM & COM	01	REVISED AS PER CUSTOMER COMMENTS
157	158	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
158	159	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
159	160	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
160	161	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
161	162	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS

Sheet	n.sh.	Description 1	Description 2	Rev.	Revision note
162	163	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY INPUTS	01	REVISED AS PER CUSTOMER COMMENTS
163	164	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
164	165	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
165	166	RETROFIT OF REB670 RELAY	M2-BUS 4 BINARY OUTPUTS	01	REVISED AS PER CUSTOMER COMMENTS
166	167	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
167	168	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
168	169	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
169	170	RETROFIT OF REB670 RELAY	M2-BUS 4 OVERVIEW	01	REVISED AS PER CUSTOMER COMMENTS
170	171	RETROFIT OF REB670 RELAY	96A OPTD	01	REVISED AS PER CUSTOMER COMMENTS
171	172	RETROFIT OF REB670 RELAY	96B OPTD	01	REVISED AS PER CUSTOMER COMMENTS
172	173	RETROFIT OF REB670 RELAY	ANNUCIATION CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
173	173.1	RETROFIT OF REB670 RELAY	ANNUCIATION CIRCUITS	01	REVISED AS PER CUSTOMER COMMENTS
173.1	173.2	RETROFIT OF REB670 RELAY	ANNUNCIATOR CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS
173.2	174	RETROFIT OF REB670 RELAY	ANNUNCIATOR CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS
174	175	RETROFIT OF REB670 RELAY	EVENT LOGGER CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS
175		RETROFIT OF REB670 RELAY	EVENT LOGGER CIRCUIT	01	REVISED AS PER CUSTOMER COMMENTS

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
LIST OF CONTENTS

HITACHI Hitachi Energy India Limited

Doc. kind. LIST OF CONTENTS
DCC EAB
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-AGCA
Sheet 4
n. sheet 21

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

TERMINAL BLOCK DESIGNATION FOR EXTERNAL WIRING

X01	CT CIRCUITS
X02	CVT/PT CIRCUITS
DCX03, ACX03	DC/AC INCOMING CIRCUITS
X04	CONTROL CIRCUITS
X05	INDICATION CIRCUITS
X06	ANNUNCIATION CIRCUITS
X07	SPARE CONTACTS
X08	SCADA/DAS/EVENT LOGGER CKTS
52*X04	CB CIRCUITS
89*X04	ISOLATOR CIRCUITS
BBX04	BUSBAR CIRCUIT
TRX04	TRANSFORMER TROUBLE/ RTCC/FIRE FIGHTING
PLX04	PLCC CIRCUIT
AXX1.1,AXX1.2, BXX1.1,BXX1.2	DC CIRCUITS FOR LOOPING

TERMINAL BLOCK DESIGNATION FOR INTERPANEL BUS WIRING

AX11,BX11 CX11,DX11	CT CIRCUITS
AX12,BX12 CX12,DX12	CVT CIRCUITS
DCX13, ACX13	DC/AC INCOMING CIRCUITS
X14	CONTROL CIRCUITS
BBX14	BUSBAR CIRCUIT

TERMINAL BLOCKS

	NON DISCONNECTING TB
	DIS CONNECTING TB
	CT/CVT JUNCTION BOX TERMINAL
	BREAKER TERMINAL
	ISOLATOR TERMINAL
	MARSHALLING KIOSK TB
	PLCC/FOTE TERMINALS
	ACDB/DCDB TERMINALS

SYMBOL LIST

	MCB
	FUSE
	LINK
	RELAY COIL
	RELAY REVERSE FLAG
	RELAY MANUAL RESET FLAG
	PUSH BUTTON ON CONTACT
	NO CONTACT
	NC CONTACT
	EARTH
	SWITCH CONTACT
	LED LAMP
	SPACE HEATER
	DIODE
	RESISTOR
	VARISTOR

SYMBOL LIST

	BINARY INPUT
	BINARY OUTPUT
	CHANGE OVER OUTPUT
	CT/PT INPUT
	mA INPUT
	POWER SUPPLY INPUT
	FO COMM. PORT
	RS232/485 COMM. PORT
	RJ45 COMM. PORT
	CURRENT TRANSFORMER
1 2 3	CVT
1 2 3	PT
P M	CIRCUIT BREAKER
S M	ISOLATOR EARTH SWITCH
	TRANSFORMER
	REACTOR/WAVE TRAP
	LIGHNING ARRESTOR

FERRULE NOMENCLATURE

FERRULE 'A' : CT CIRCUIT- MAIN PROTECTION
FERRULE 'B' : CT CIRCUIT- BUSBAR PROTECTION
FERRULE 'C' : CT CIRCUIT- BACKUP PROTECTION
FERRULE 'D' : CT CIRCUIT- METERING
FERRULE 'E' : PT CKTS
FERRULE 'H' : AUXILLARY AC CKTS
FERRULE 'J' : AUXILLARY DC CKTS
FERRULE 'K' : CONTROL CKTS
FERRULE 'L' : INDICATION CKTS
FERRULE 'P' : DC CKT- BUSBAR PROTECTION
FERRULE 'U' : SPARE CONTACTS

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

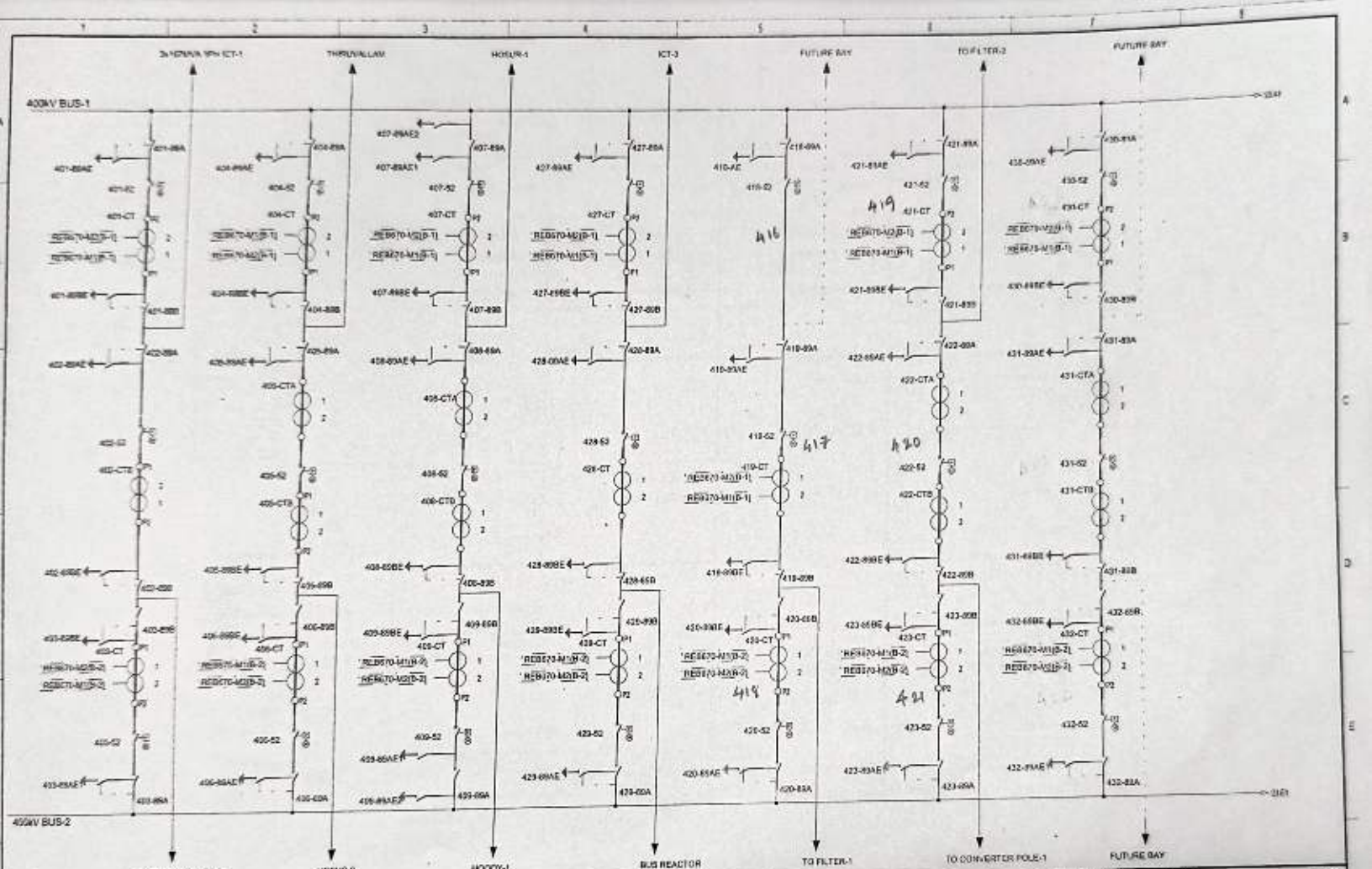
Title 400kV BUSBAR PROTECTION
LIST OF SYMBOLS
LIST OF SYMBOLS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 21
n. sheet 22

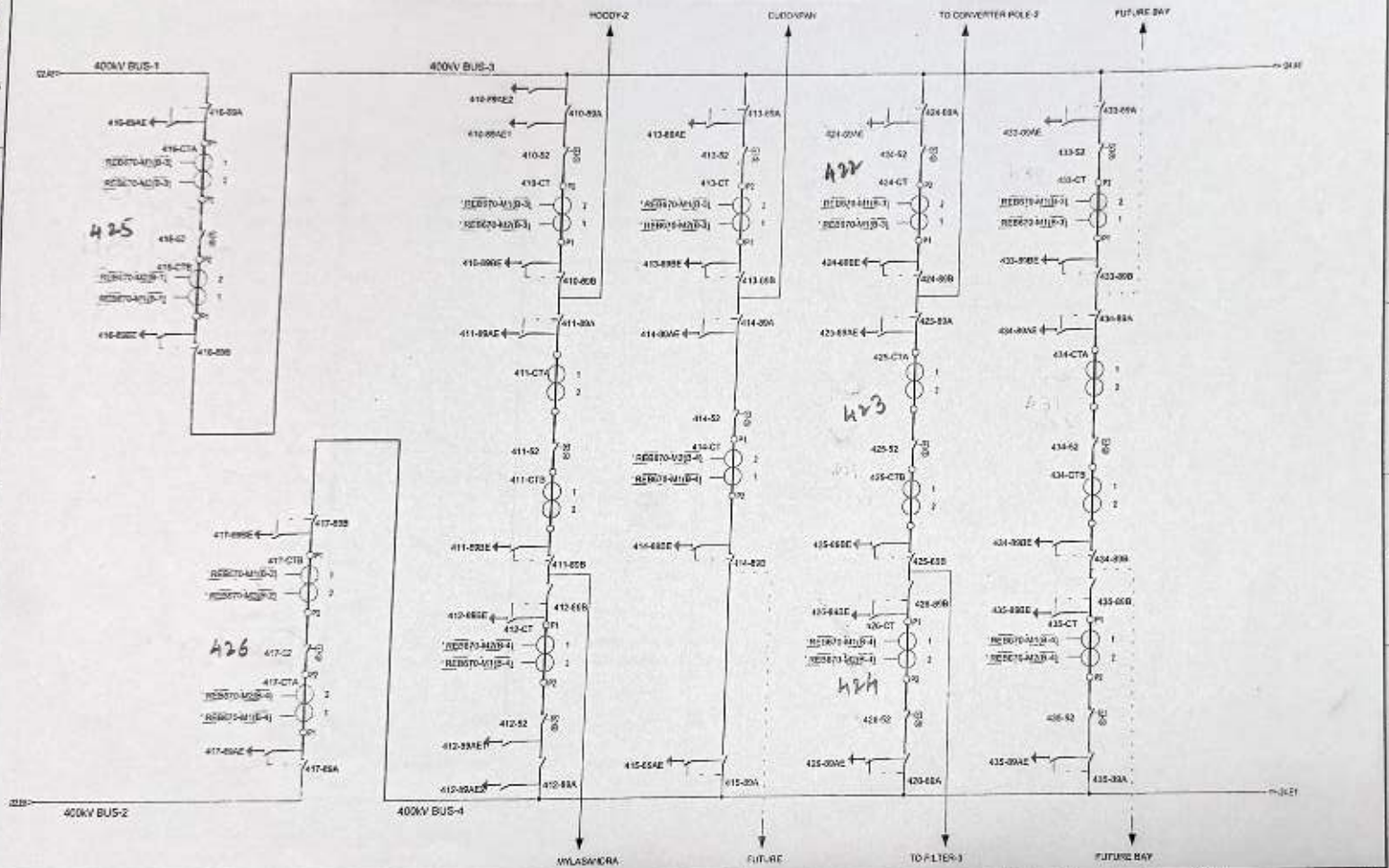
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



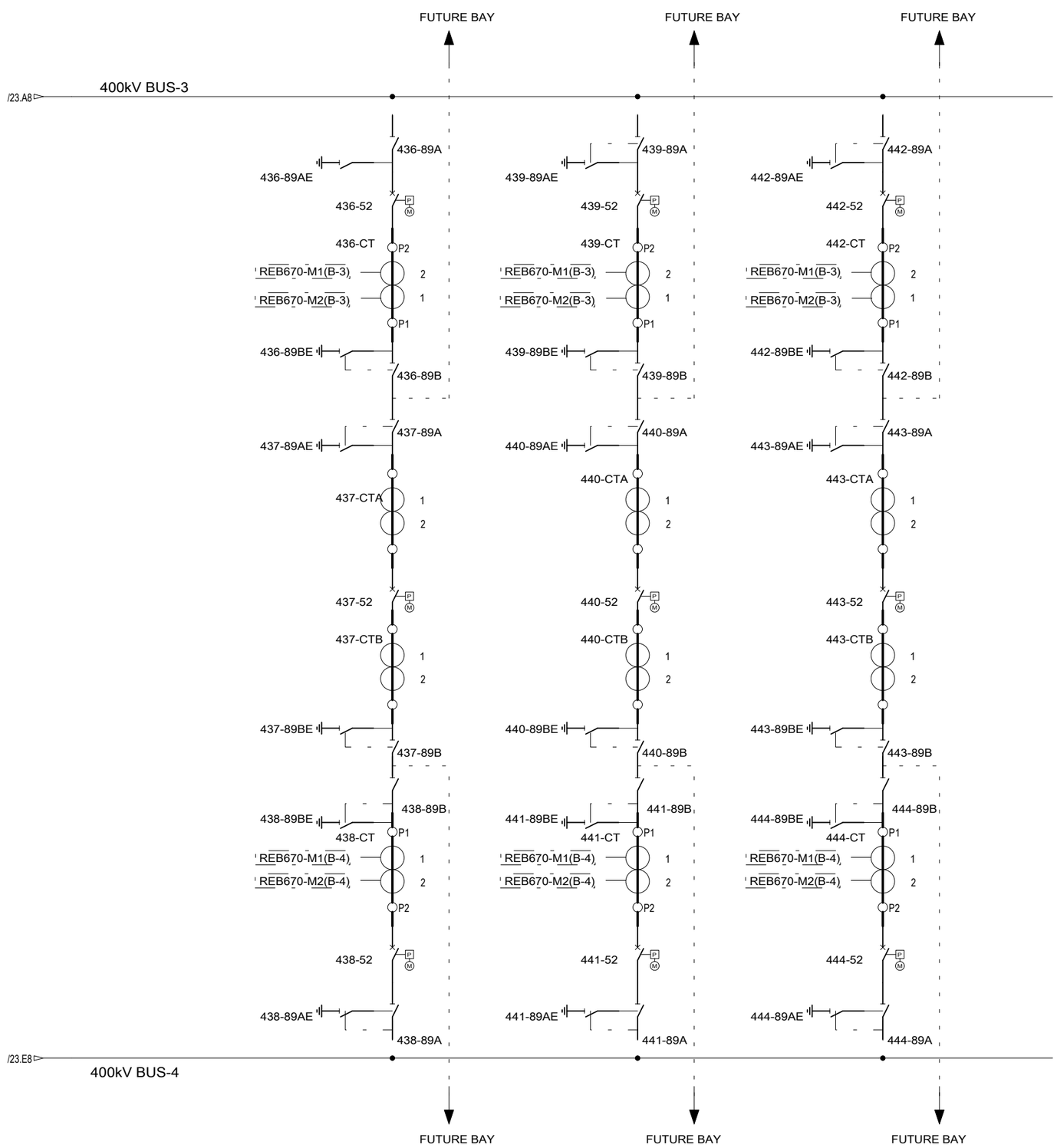
Sheet on 3100135063	Prepared	18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RES670 RELAY SLD	Doc kind Circuit diagram	Ref Doc.	=4R
	Approved	20.04.2023	DEENADAYALAN A		DCC EFS		
	Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp dept PG-GAS	Rev. ind. 00	Language en
				HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA		Sheet 22
Rev. Revision note	Date	Name					n sheet 23

1MNS801053-102(A3)(REV:01



Based on 3100135593			Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RED670 RELAY SLD	Doc. kind Circuit diagram	Ref Des. =4R
			Approved 20.04.2023	DEENADAYALAN A		DCC EFS	
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896			Resp. dept. PG-GAS	Rev. ind. 00
Rev.	Revision note	Date	Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Language en
							Sheet 23
1MNS801003-ISU/UR/EN/01							no. sheet 24

© 2023 Hitachi Energy. All rights reserved.



Based on 3100135063				Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY SLD	Doc. kind. Circuit diagram DCC EFS	Ref.Des. =4R
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 01 Language en
				Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited	Doc. no. 1MNS801837-CGCA	Sheet 24 n. sheet 25
Rev.	Revision note	Date	Name				

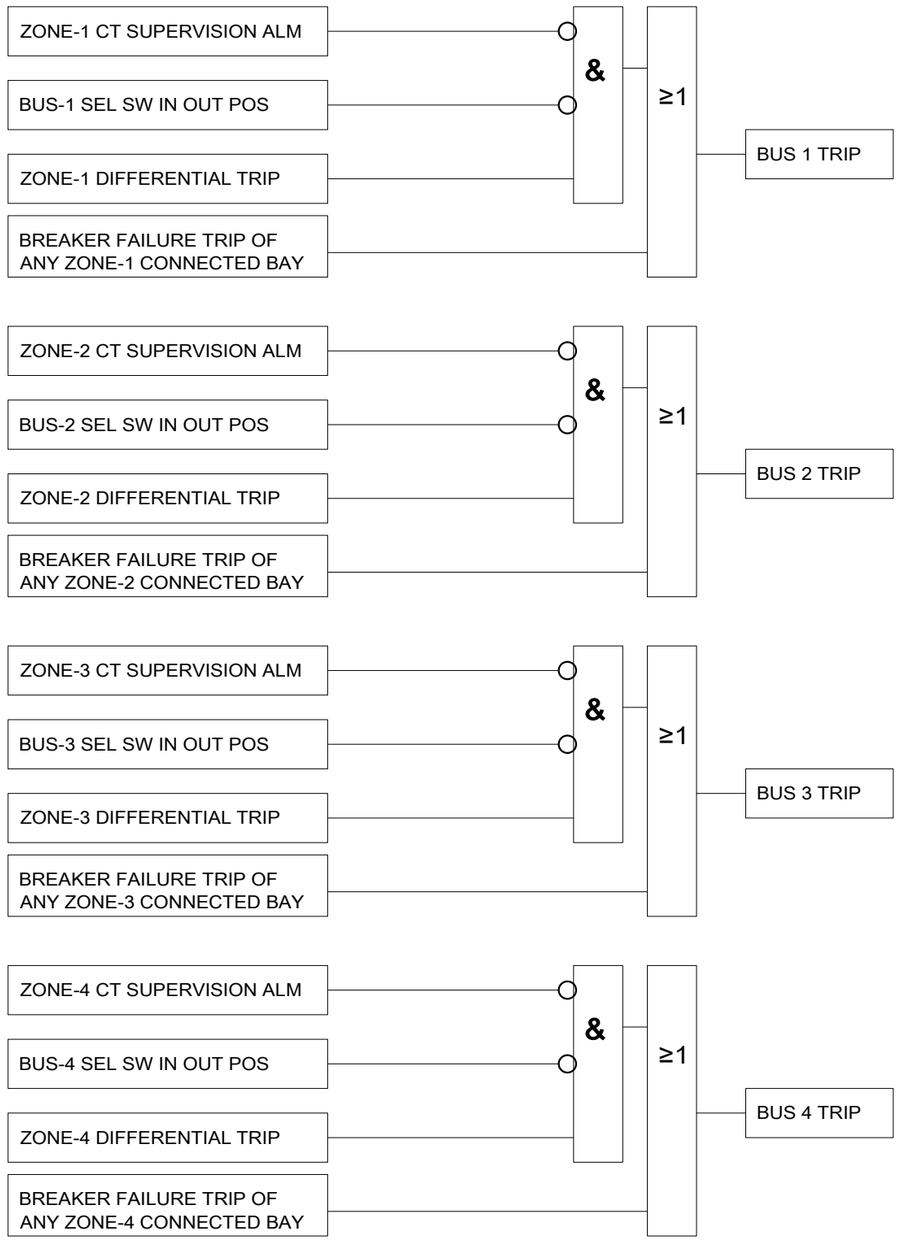
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

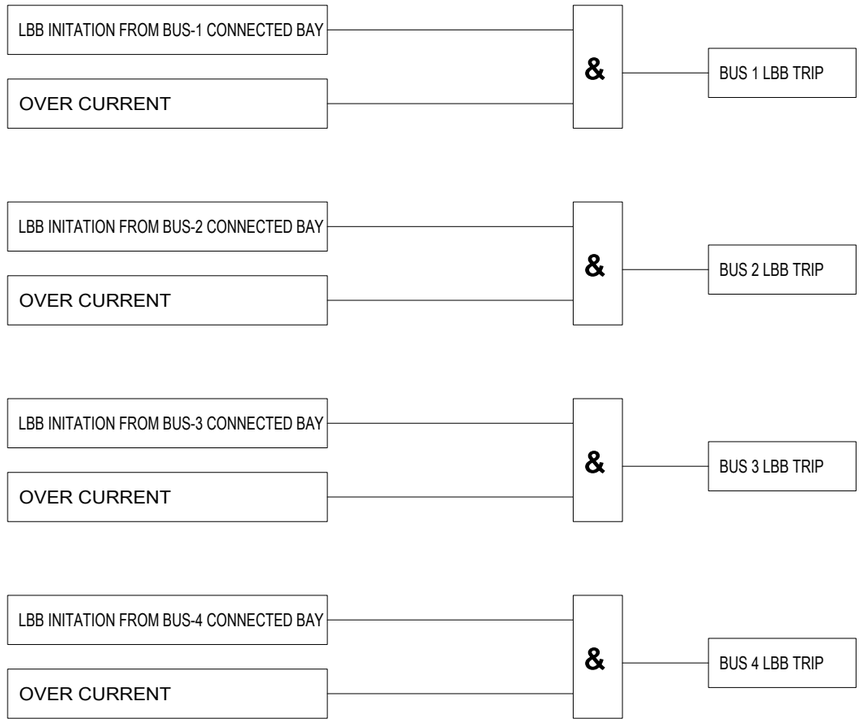
© 2023 Hitachi Energy. All rights reserved.

OVERALL BUSBAR TRIP LOGIC BUS-1/2/3/4

BUSBAR PROTECTION TRIP LOGIC BUS M1&M2



LBB PROTECTION TRIP LOGIC BUS M1&M2 (FUTURE USE)



Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

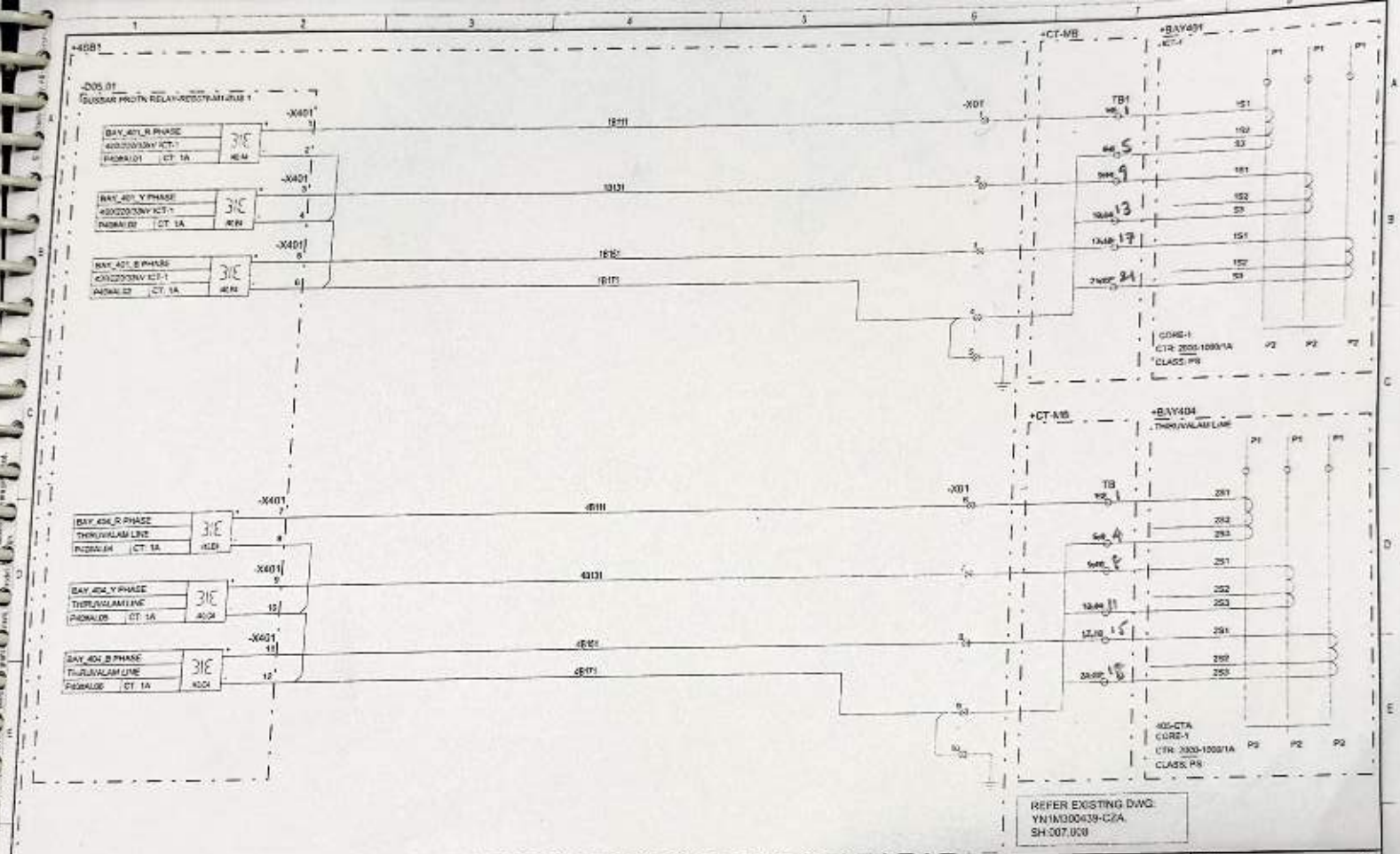
Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY BB & LBB OPTD LOGIC

HITACHI Hitachi Energy India Limited

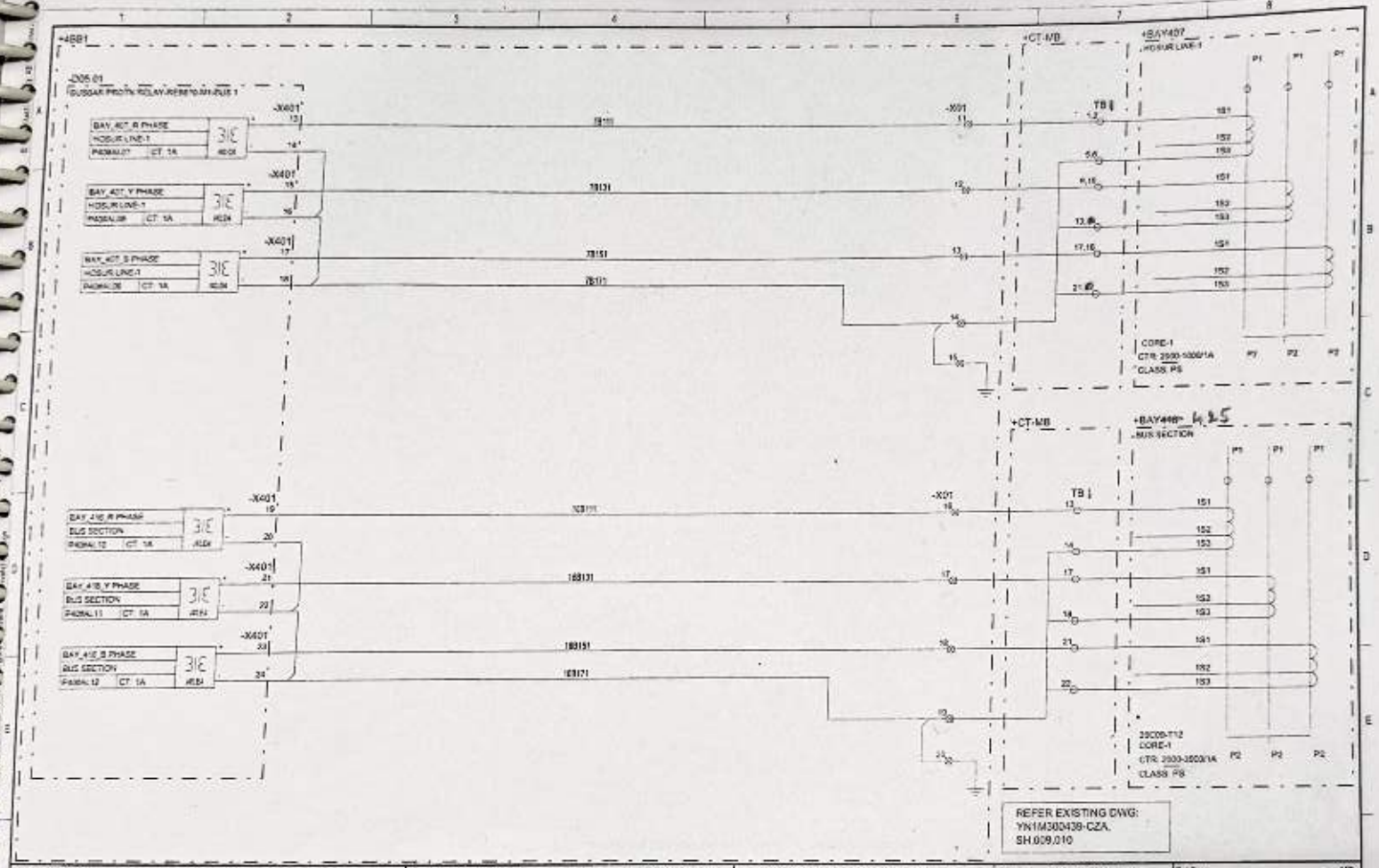
Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	25
		n. sheet	26

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

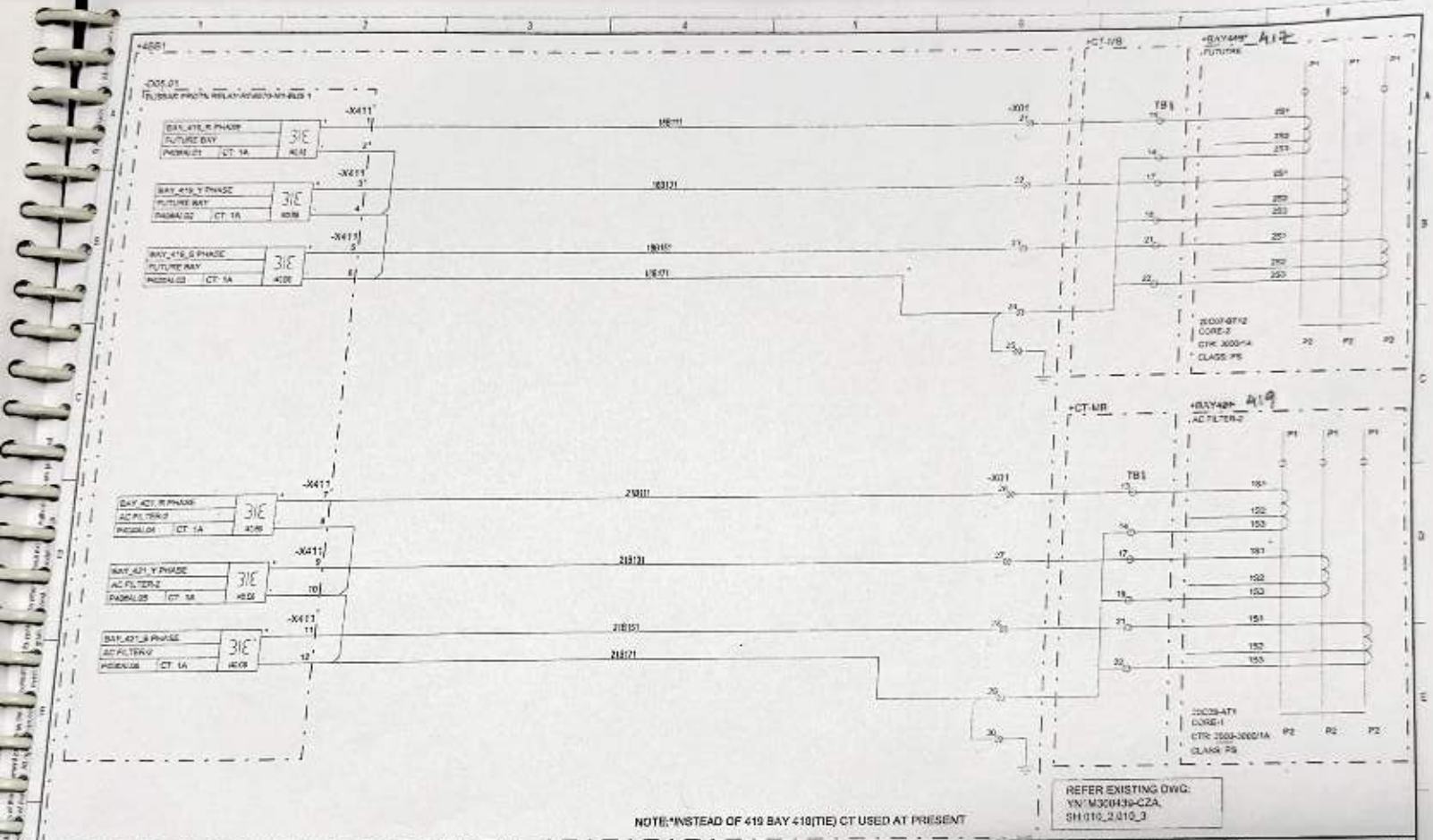


Based on 3100126503	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc. cont. Circuit diagram	Ref. Dcs.	=4R
	Approved 20.04.2023 DEENADAYALAN A		DCC: EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00	Language en
		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 28
Rev. Revision note Date Name					n. sheet 27



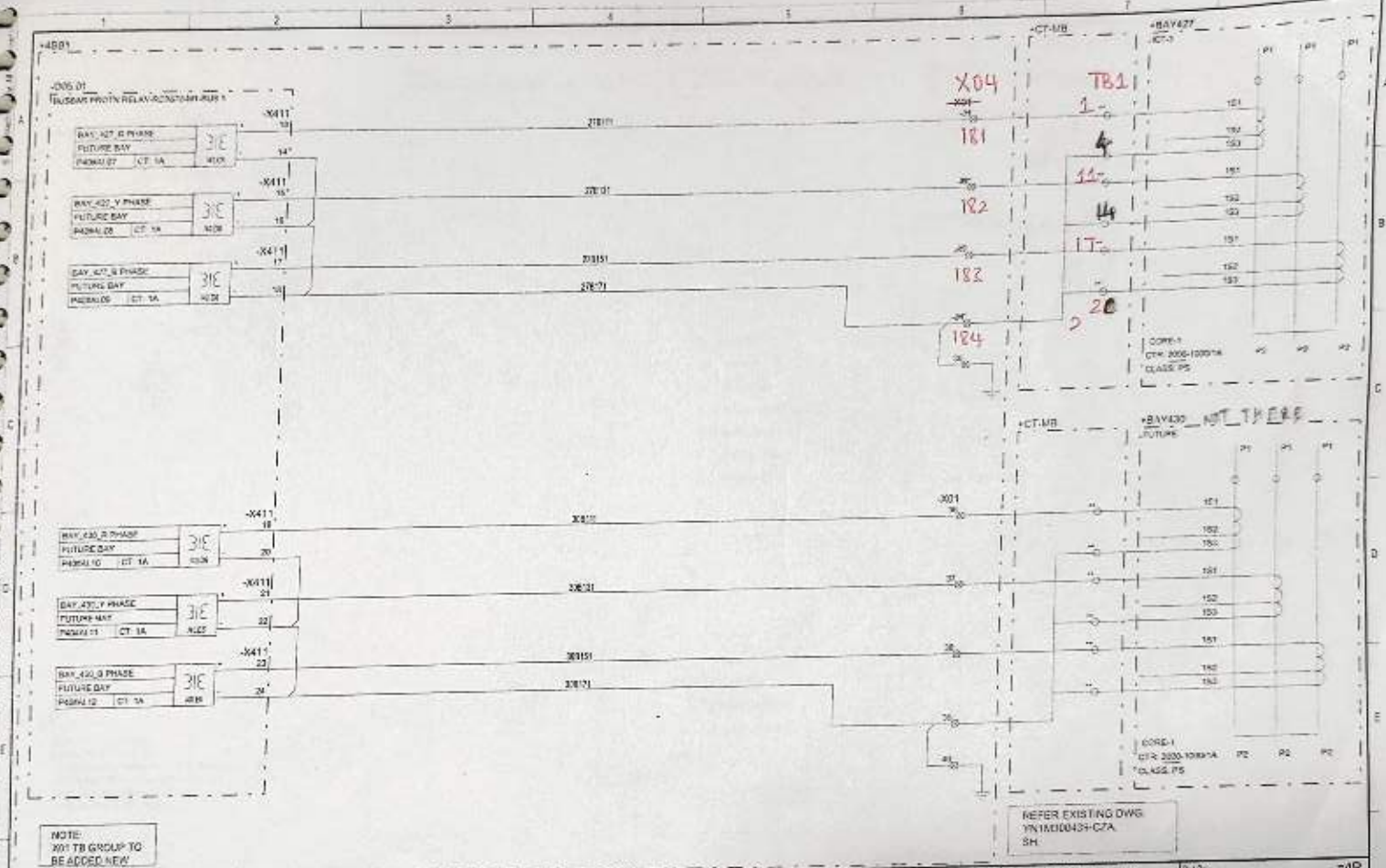
Based on 3100135363	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc.kind. Circuit diagram	Rut Doc.	=4R
	Approved 20.04.2023 DEENADAYALAN A		DCC EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896		Resp.dept. PG-GAS	Rev. ind. 00	Language en
Rev Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 27	
				n. sheet 28	

*MNS801003-R0201A2.REV01



Based on: 3100135963	Prepared: 18.04.2023	PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc. type: Circuit diagram DCC: EFS	Ref.Des. =4R
	Approved: 20.04.2023	DEENADAYALAN A		Resp. dept.: PG-GAS	Rev. no.: 00
	Project: POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137998		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no.: 1MNS801837-CGCA	Language: en Sheet: 28 t. sheet: 29
Rev.	Revision note	Date	Name		

1MNS801837-CGCA.vsd



Based on 3100135063	Prepared 13.04.2023 PANKAJ PATIL	765 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 CT CIRCUITS	Doc. kind Circuit diagram	RefDes.	=4R
	Approved 20.04.2023 DEENADAYALAN A.		302 SFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137056	HITACHI Hitachi Energy India Limited (Formerly Known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS Rev. ind. 00	Language en	
			Doc. no. 1MNS801837-CGCA	Sheet 29	
Rev. Revision note Date Name				Sheets 30	

© 2023 Hitachi Energy. All rights reserved.

+4BB1

FROM SH: 006/2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

-X13 -813-01 -813-02

5 J5 1 2 4A
6 J6 1 2 4A

PSM
-X11
4 +
5 -
90-250VDC
PE
/40.B1

K101 +D.11-D11.02:1P3 /31.A5
K102 +B.05-1XX2:1 /31.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.101.101
Test
Normal
1B 1A
2B 2A
3B 3A
4B 4A
5B 5A
6B 6A
7B 7A
8B 8A
9B 9A
10B 10A
11B 11A
12B 12A
13B 13A
14B 14A
15B 15A
16B 16A
17B 17A
18B 18A

-D21.113.101
Test
Normal
1B 1A
2B 2A
3B 3A /26.A4
4B 4A /26.B4
5B 5A /26.B4
6B 6A /26.B4
7B 7A /26.D4
8B 8A /26.D4
9B 9A /26.E4
10B 10A /26.E4
11B 11A /27.A4
12B 12A /27.B4
13B 13A /27.B4
14B 14A /27.B4
15B 15A /27.D4
16B 16A /27.D4
17B 17A /27.E4
18B 18A /27.E4

-D21.125.101
Test
Normal
1B 1A
2B 2A
3B 3A /29.A4
4B 4A /29.B4
5B 5A /29.B4
6B 6A /29.B4
7B 7A /29.D4
8B 8A /29.D4
9B 9A /29.E4
10B 10A /29.E4
11B 11A
12B 12A
13B 13A
14B 14A
15B 15A
16B 16A
17B 17A
18B 18A

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:012

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 30
n. sheet 31

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB1

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

-X31 1	MAIN 1 BUS 1 PROT IN	P3#BI.01	220-250VDC	/41.A2
-X31 3	MAIN 1 BUS 1 PROT OUT	P3#BI.02	220-250VDC	/41.B2
-X31 5	SPARE	P3#BI.03	220-250VDC	/41.B2
-X31 7	TRIP RELAY RESET 96A BUS-1	P3#BI.04	220-250VDC	/41.B2
-X31 9	SPARE	P3#BI.05	220-250VDC	/41.C2
-X31 11	SPARE	P3#BI.06	220-250VDC	/41.C2
-X31 13	SPARE	P3#BI.07	220-250VDC	/41.C2
-X31 15	REB670 RELAY FAULTY BUS 1 - MAIN 2	P3#BI.08	220-250VDC	/41.D2

-1XX2 1

+D.05-D05.01:5 (-X11) /30.B2
K102

+D.05-D05.01:4 (-X11) /30.B2
K101

K103
K104
K105
K106
K107
K108
K109
K110

-D11.02
1P3 — 1P4 /31.A7 IN
BB-1 M1 IN/OUT SWITCH

-D11.02
1P2 /31.A7 OUT — 1P1
BB-1 M1 IN/OUT SWITCH

-1X04
1 K101 /170.B4
2 K106 /170.A1 +D.13-D13.101.101:221
3 K107
4 K108
5 K109

+4BB1

-D11.02
1P2 /31.B4 — 1P1 — C — 1P3 — 1P4 /31.B4 — A
2P2 — 2P1 — C — 2P3 — 2P4 — A
3P2 — 3P1 — C — 3P3 — 3P4 — A
4P2 — 4P1 — C — 4P3 — 4P4 — A
IN A
OUT C
BB-1 M1 IN/OUT SWITCH

+4BB5

+D.05
-X14A 1 — -X14A 1 — -X11 2
-X14A 2 — -X14A 2 — -X11 3
-X11 1
/112.B2
BB RELAY FAULTY
BUS-1 MAIN2

NOTE:
1X04 TB GROUP
TO BE ADDED NEW

+B.05-1XX2:2
/32.A3 K102

+B.17-X04:13
/32.A5 K101

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

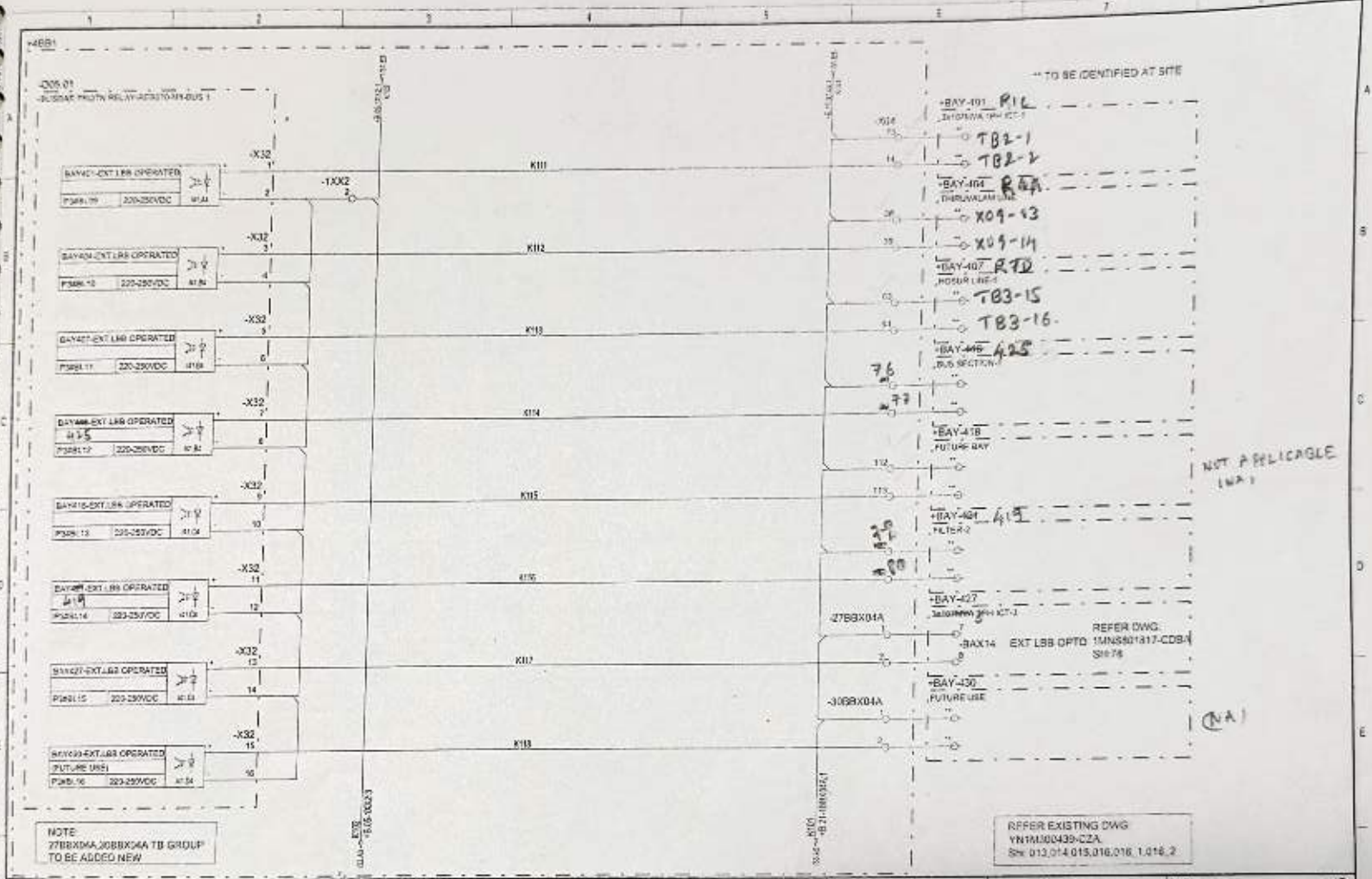
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

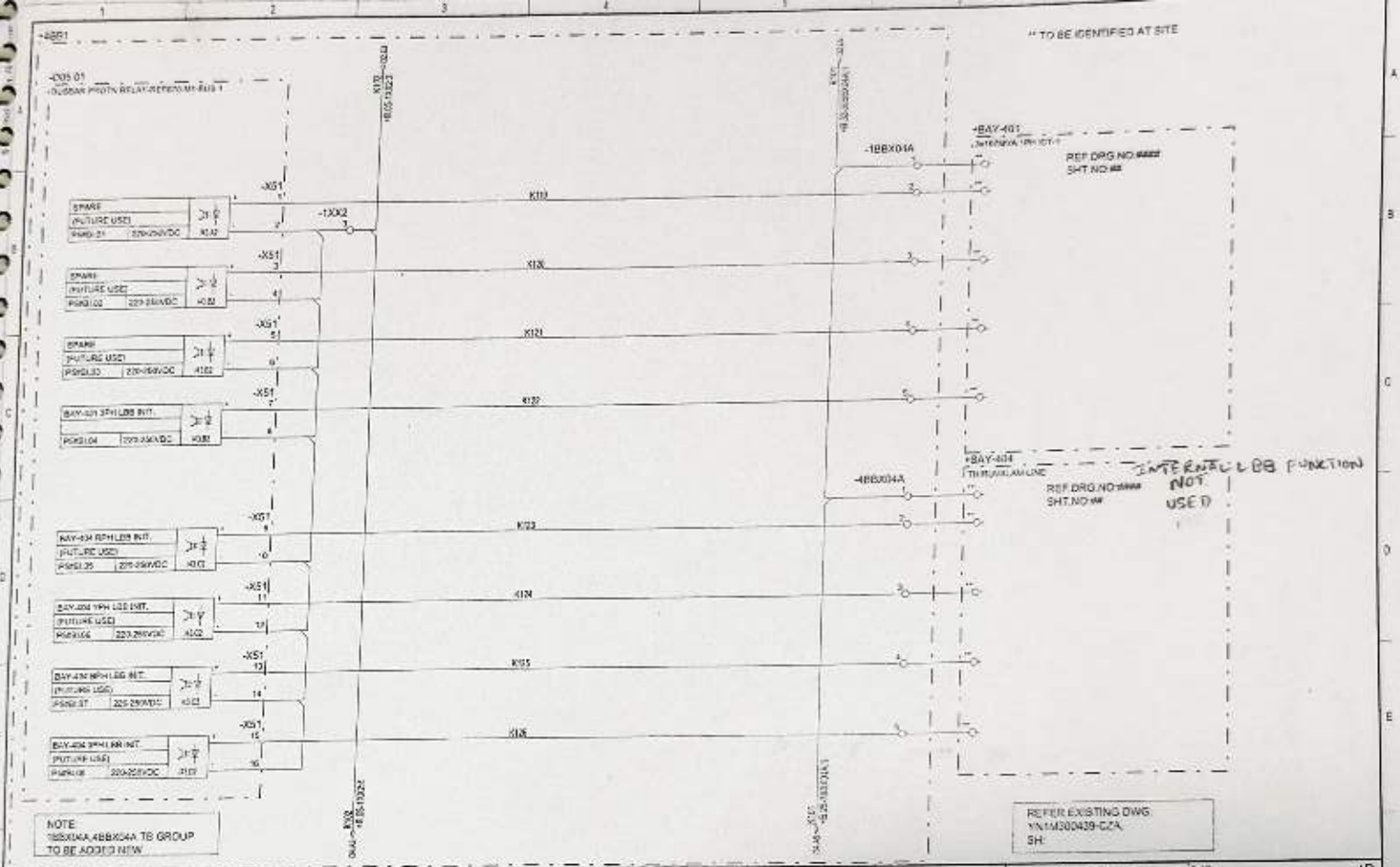
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 31
n. sheet 32

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

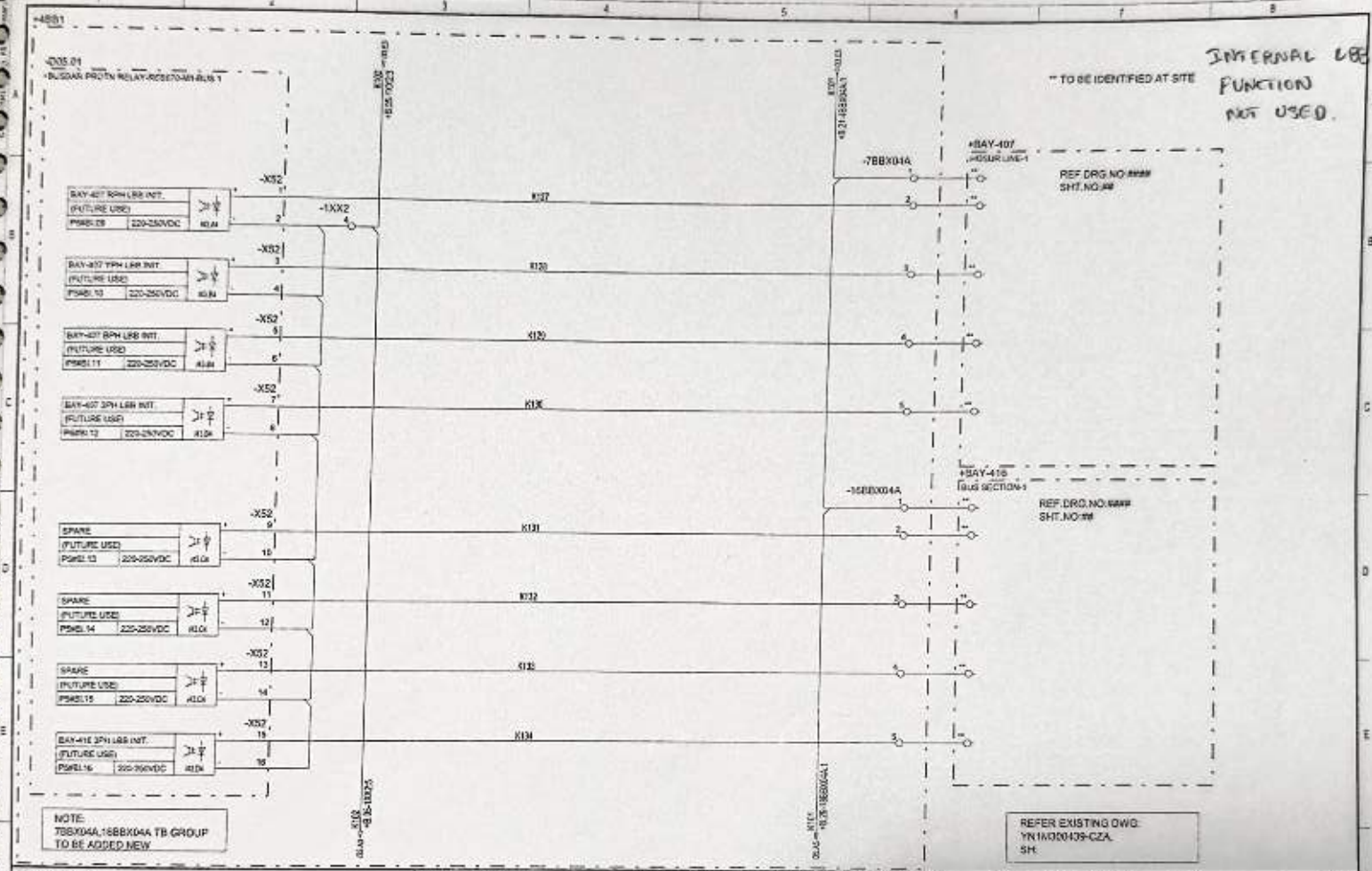


Based on 3100136063	Prepared	18.04.2023	PANKAJ PATIL	Tde 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS	Doc kind Circuit diagram	Ref Des	=4R
	Approved	20.04.2023	DEENADAYALAN A		DOC EFS		
	Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note	Date	Name		HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA		Sheet 32
							No. sheet 33

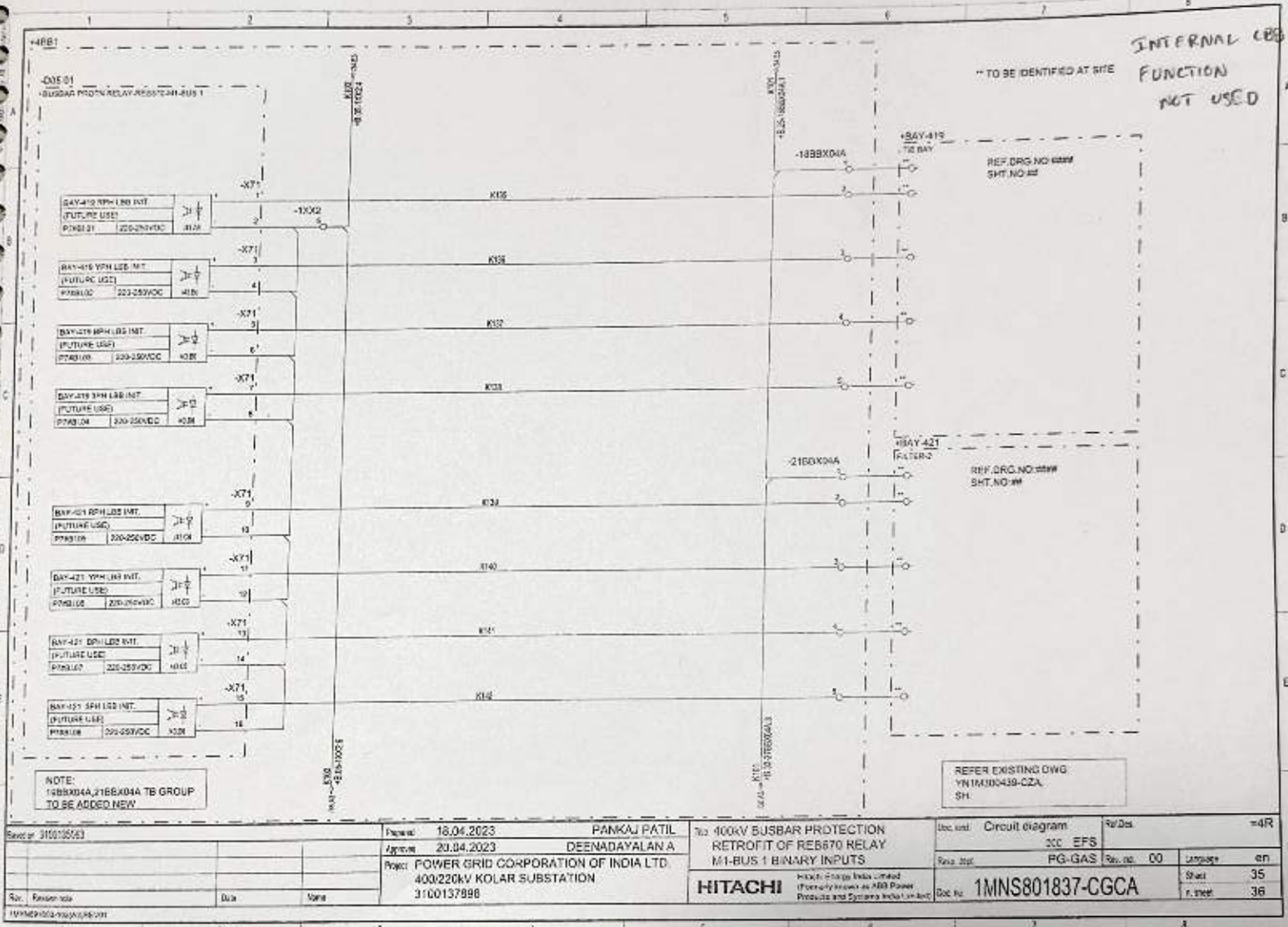


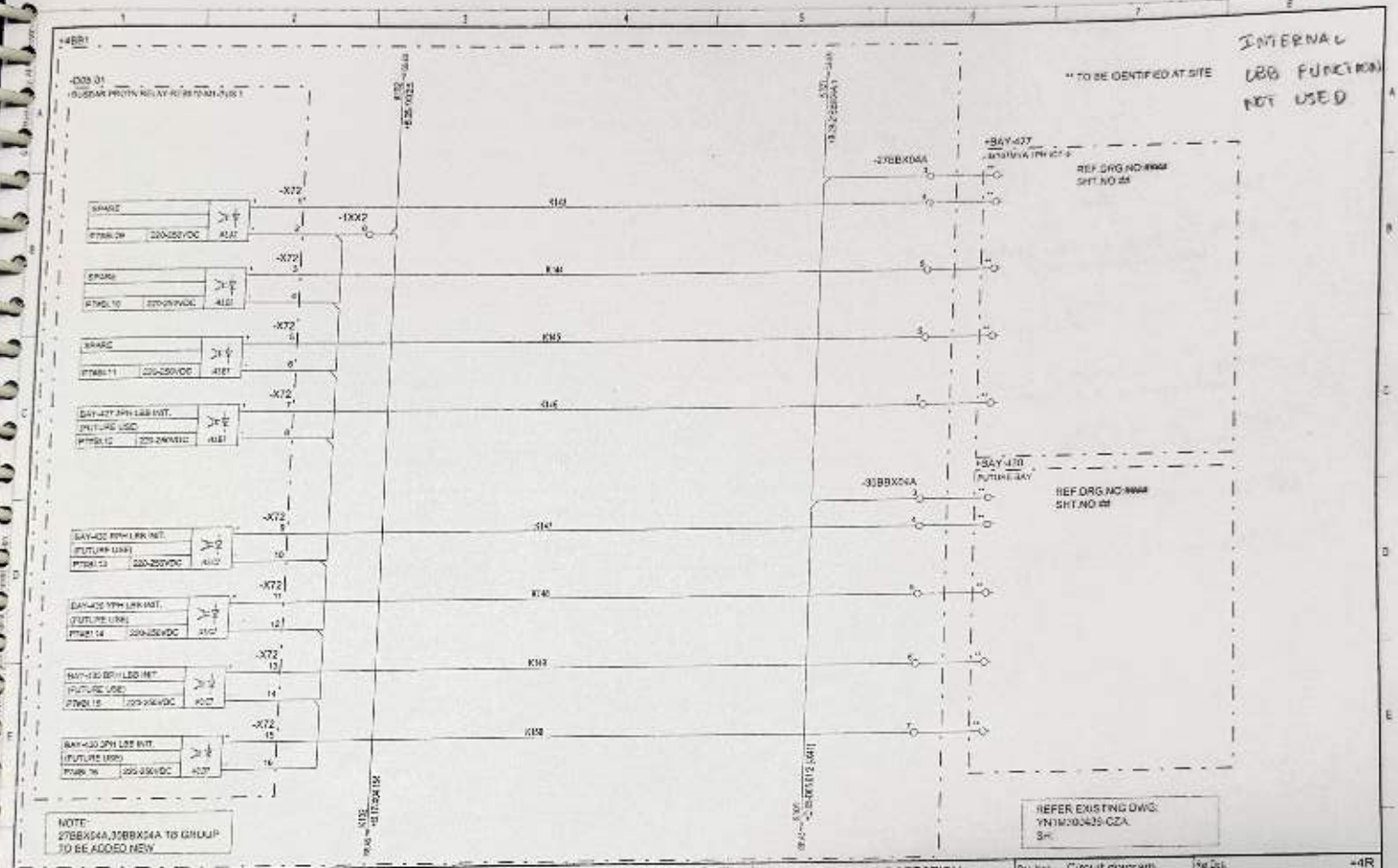
Based on 3100137993			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS	Doc kind Circuit diagram	Rel/Ba.	=4R
			Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137998	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. no. 00	Language en
					Doc. no. 1MNS801837-CGCA		Sheet 33
Rev.	Revision note	Date	Name				n. sheet 34

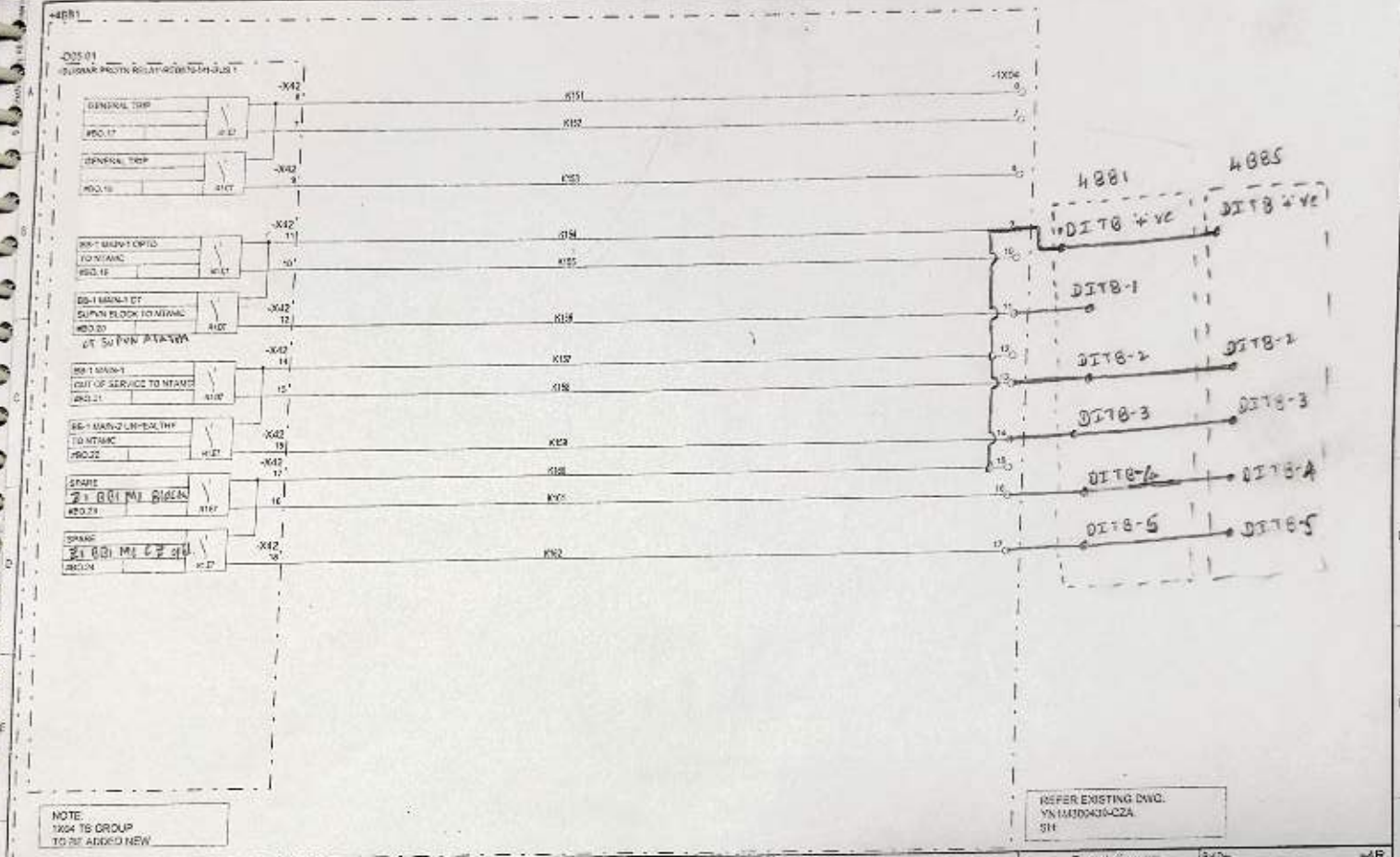
1MNW801000-1SUA01REV01



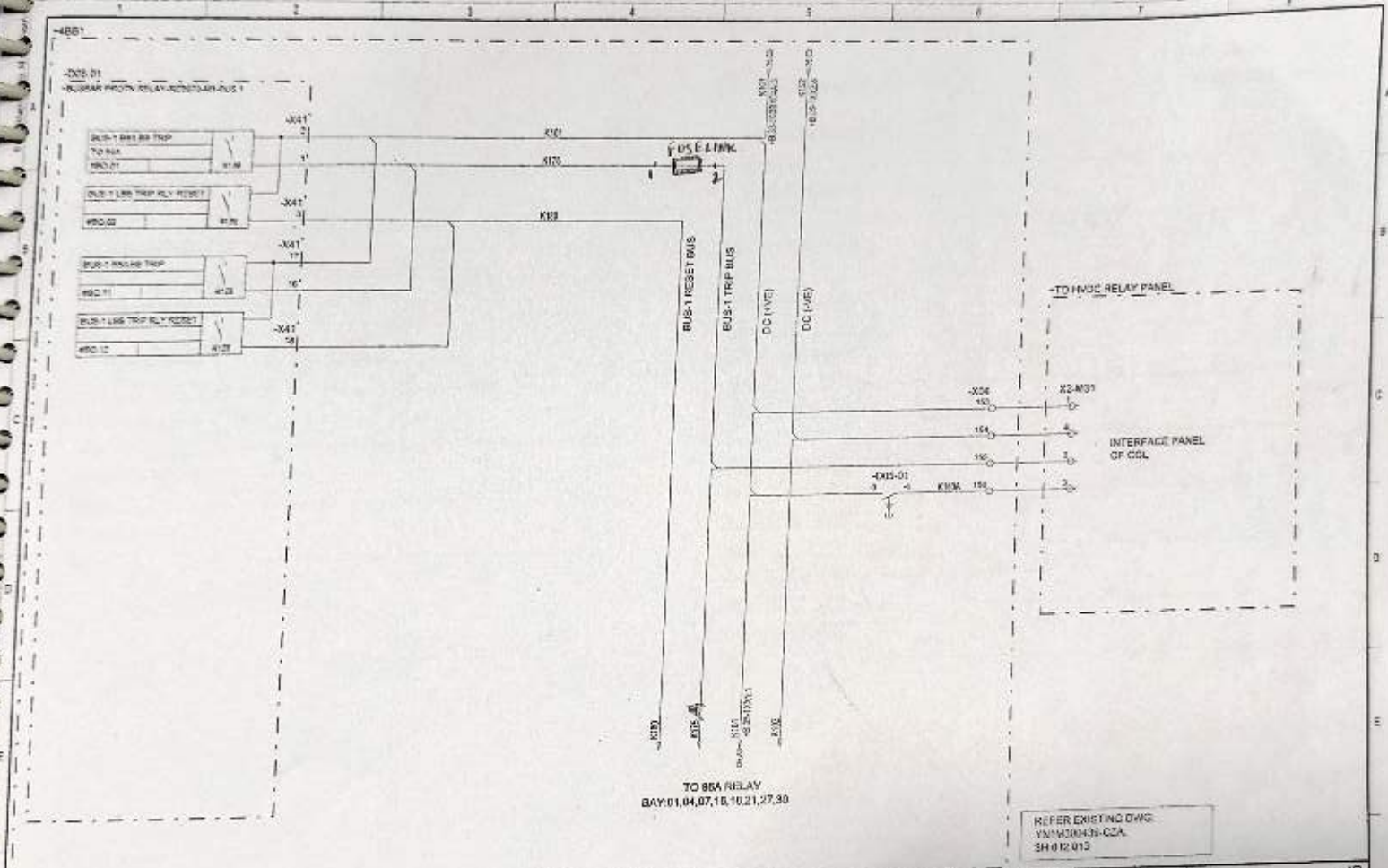
Based on 3100135963	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS	Doc. type Circuit diagram	Rel.Doc.	=4R
	Approved 20.04.2023 DEENADAYALAN A.		Doc. spec. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Template code PG-GAS	Rev. no. C0	Language en
Rev. Revision note	Date Name	HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 34 / No. sheet 35
SMWW1003-100,A3,REV01					


INTERNAL CB FUNCTION NOT USED
** TO BE IDENTIFIED AT SITE
+BAY-415
TIE BAY
-189BX04A
REF.DRG.NO:#####
SHT.NO:##
+BAY-421
FILTER-2
-216BX04A
REF.DRG.NO:#####
SHT.NO:##
NOTE:
189BX04A,216BX04A TB GROUP TO BE ADDED NEW
REFER EXISTING DWG
YN1M300439-CZA,
SH:
Based on 3100135563
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD
400/220kV KOLAR SUBSTATION
3100137998
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY INPUTS
Doc kind Circuit diagram
Doc type PG-GAS
Rev. no. 00
Language en
Sheet 35
n. sheet 36
HITACHI
Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Ltd.)
Doc. no. 1MNS801837-CGCA
Rev. Revision note Date Name

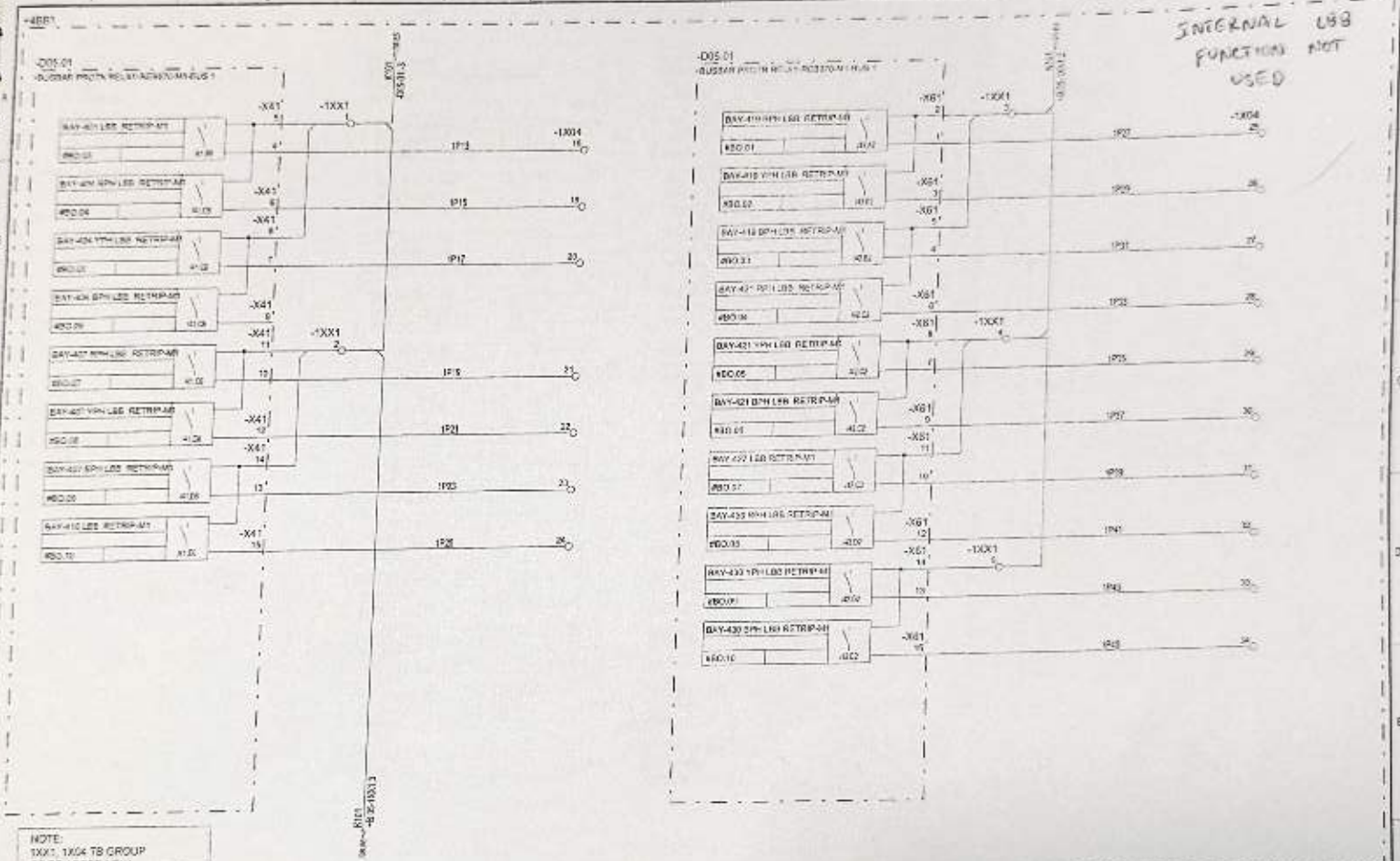

INTERNAL LBB FUNCTION NOT USED
** TO BE IDENTIFIED AT SITE
+BAY-427
REF.ORG NO:
SHT.NO:
+BAY-428
(FUTURE BAY)
REF.ORG NO:
SHT.NO:
-27BBX04A
-30BBX04A
-X72
-1XX2
K161
K141
K143
K145
K147
K149
K151
K153
K155
K157
K159
NOTE:
27BBX04A,30BBX04A TO GROUP TO BE ADDED NEW
REFER EXISTING DWG:
YN1M200425-CGA
SH:
Circuit diagram
PG-GAS
1MNS801837-CGCA
00
36
37
PANKAJ PATIL
DEENADAYALAN A
18.04.2023
20.04.2023
POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898
400KV BUSBAR PROTECTION
RETROFIT OF RES670 RELAY
M1-BUS 1 BINARY INPUTS
HITACHI



Based on 3100135909	Prepared	18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY OUTPUTS	Doc. type: Circuit diagram	Rel Des.	-4R
	Approved	20.04.2023	DEENADAYALAN A		Doc. cont. 002 EFS		
	Project: POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898				Resp. dept. PG-GAS	Rev. no. 00	Language en
				HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 37
Rev.	Revision note	Date	Name				No. sheet 38

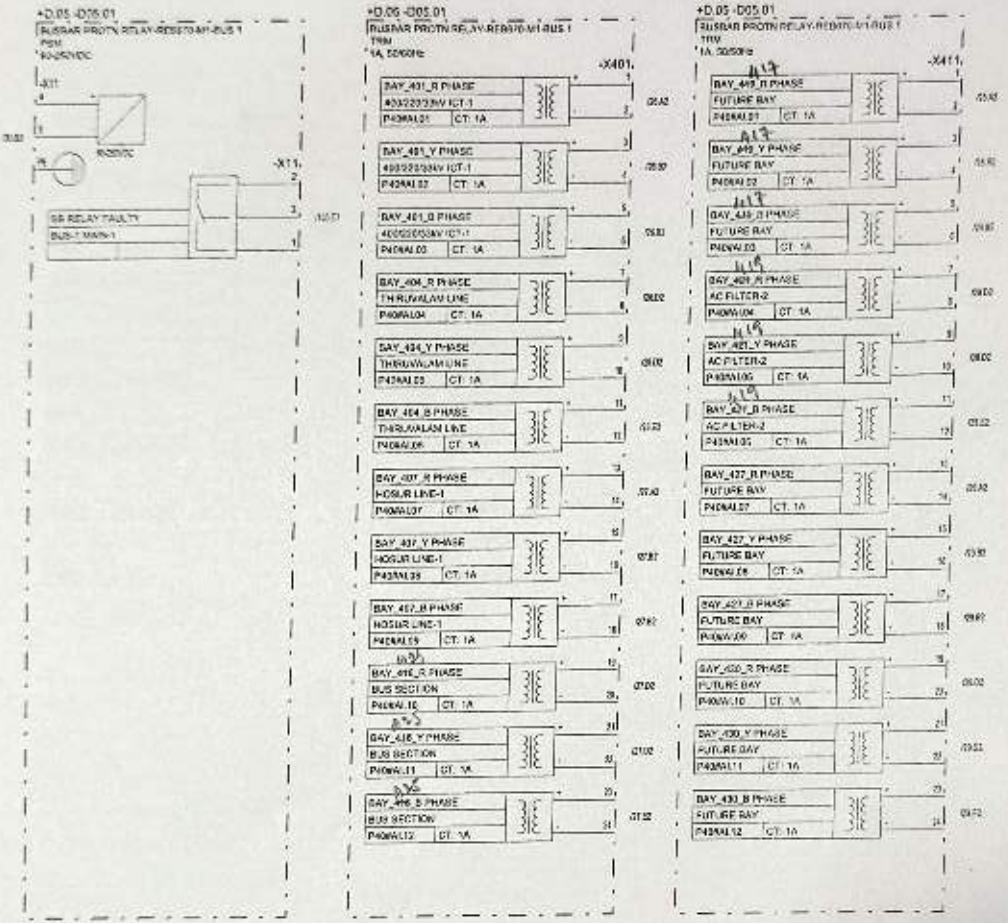


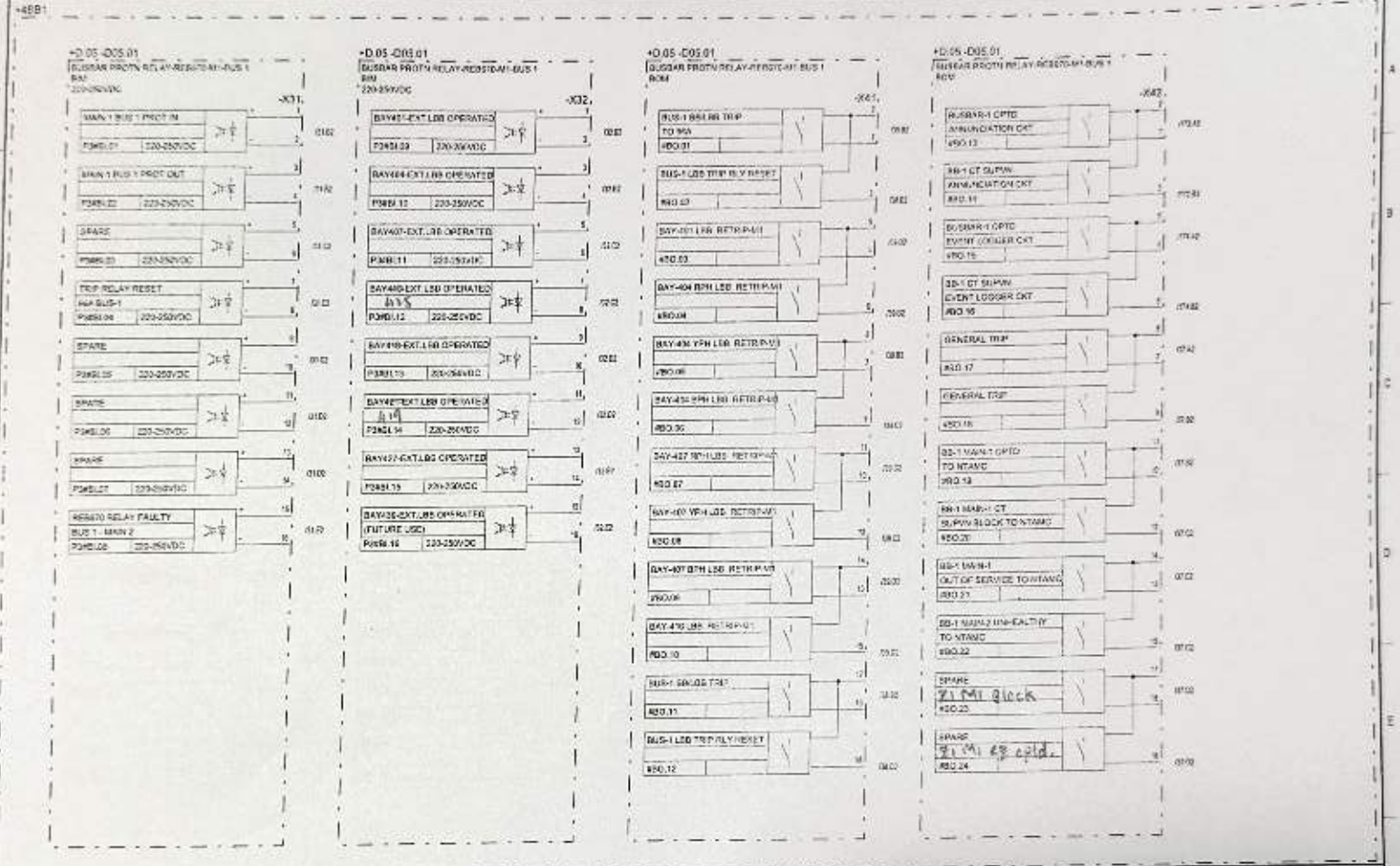
Based on: 3100136963	Prepared: 19.04.2023 PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY OUTPUTS	Doc kind: Circuit diagram	Ref Dgs.	=4R
	Approved: 20.04.2023 DEENADAYALAN A		CCF EFS		
	Project: POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Proj. dept: PG-GAS Rev. nr: 00	Language: en	
			Doc nr: 1MNS801837-CGCA	Sheet: 38	
				n. sheet: 39	



Based on 3100135363			Prepared 18.04.2023	PANKAJ PATIL	
			Approved 20.04.2023	DEENADAYALAN A	
Rev.	Revision note	Date	Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137998	

for 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 BINARY OUTPUTS	Doc. kind Circuit diagram	Ref Des.	=4R
	Doc. type 300 EFS		
HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept PG-GAS	Rev. ind. 00	Language en
	Doc. no. 1MNS801837-CGCA		Sheet 39
			# sheet 40


+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BAY_401_R PHASE
BAY_401_Y PHASE
BAY_401_B PHASE
BAY_404_R PHASE
BAY_404_Y PHASE
BAY_404_B PHASE
BAY_407_R PHASE
BAY_407_Y PHASE
BAY_407_B PHASE
BAY_416_R PHASE
BAY_416_Y PHASE
BAY_416_B PHASE
BAY_417_R PHASE
BAY_417_Y PHASE
BAY_417_B PHASE
BAY_420_R PHASE
BAY_420_Y PHASE
BAY_420_B PHASE
BAY_421_R PHASE
BAY_421_Y PHASE
BAY_421_B PHASE
BAY_427_R PHASE
BAY_427_Y PHASE
BAY_427_B PHASE
BAY_430_R PHASE
BAY_430_Y PHASE
BAY_430_B PHASE
FUTURE BAY
AC FILTER-2
BUS SECTION
THIRUVALAM LINE
HOSUR LINE-1
SR RELAY FAULTY



Spec nr. 3100135083	Prepared 18.04.2023 PANKAJ PATIL	Tit 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 OVERVIEW	Doc kind Circuit diagram	Rel Doc.	=4R
	Approved 20.04.2023 DEENADAYALAN A		Doc. no. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137808		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Sheet 41	
				n. sheet 42	

© 2023 Hitachi Energy. All rights reserved.

+4BB1

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 1
BOM

-X61

BAY-419 RPH LBB RETRIP-M1 #BO.01	2	1	/39.B5
BAY-419 YPH LBB RETRIP-M1 #BO.02	3		/39.B5
BAY-419 BPH LBB RETRIP-M1 #BO.03	5	4	/39.B5
BAY-421 RPH LBB RETRIP-M1 #BO.04		6	/39.C5
BAY-421 YPH LBB RETRIP-M1 #BO.05	8	7	/39.C5
BAY-421 BPH LBB RETRIP-M1 #BO.06		9	/39.C5
BAY-427 LBB RETRIP-M1 #BO.07	11	10	/39.D5
BAY-430 RPH LBB RETRIP-M1 #BO.08		12	/39.D5
BAY-430 YPH LBB RETRIP-M1 #BO.09	14	13	/39.D5
BAY-430 BPH LBB RETRIP-M1 #BO.10		15	/39.E5
BUSBAR-1 Bph OPTD EVENT LOGGER CKT #BO.11	17	16	/174.B2
BB-1 CT SUPVN EVENT LOGGER CKT #BO.12		18	/174.B2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 1
BOM

X62

SPARE #BO.13	2	1
SPARE #BO.14		3
SPARE #BO.15	5	4
SPARE #BO.16		6
SPARE #BO.17	8	7
SPARE #BO.18		9
SPARE #BO.19	11	10
SPARE #BO.20		12
SPARE #BO.21	14	13
SPARE #BO.22		15
SPARE #BO.23	17	16
SPARE #BO.24		18

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 42
n. sheet 43

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB1

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X51

SPARE (FUTURE USE) P5#BI.01 220-250VDC	+ 1	- 2	/33.B2
SPARE (FUTURE USE) P5#BI.02 220-250VDC	+ 3	- 4	/33.B2
SPARE (FUTURE USE) P5#BI.03 220-250VDC	+ 5	- 6	/33.C2
BAY-401 3PH LBB INIT. P5#BI.04 220-250VDC	+ 7	- 8	/33.C2
BAY-404 RPH LBB INIT. (FUTURE USE) P5#BI.05 220-250VDC	+ 9	- 10	/33.D2
BAY-404 YPH LBB INIT. (FUTURE USE) P5#BI.06 220-250VDC	+ 11	- 12	/33.D2
BAY-404 BPH LBB INIT. (FUTURE USE) P5#BI.07 220-250VDC	+ 13	- 14	/33.E2
BAY-404 3PH LBB INIT. (FUTURE USE) P5#BI.08 220-250VDC	+ 15	- 16	/33.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X52

BAY-407 RPH LBB INIT. (FUTURE USE) P5#BI.09 220-250VDC	+ 1	- 2	/34.B2
BAY-407 YPH LBB INIT. (FUTURE USE) P5#BI.10 220-250VDC	+ 3	- 4	/34.B2
BAY-407 BPH LBB INIT. (FUTURE USE) P5#BI.11 220-250VDC	+ 5	- 6	/34.C2
BAY-407 3PH LBB INIT. (FUTURE USE) P5#BI.12 220-250VDC	+ 7	- 8	/34.C2
SPARE (FUTURE USE) P5#BI.13 220-250VDC	+ 9	- 10	/34.D2
SPARE (FUTURE USE) P5#BI.14 220-250VDC	+ 11	- 12	/34.D2
SPARE (FUTURE USE) P5#BI.15 220-250VDC	+ 13	- 14	/34.E2
BAY-416 3PH LBB INIT. (FUTURE USE) P5#BI.16 220-250VDC	+ 15	- 16	/34.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X71

BAY-419 RPH LBB INIT. (FUTURE USE) P7#BI.01 220-250VDC	+ 1	- 2	/35.B2
BAY-419 YPH LBB INIT. (FUTURE USE) P7#BI.02 220-250VDC	+ 3	- 4	/35.B2
BAY-419 BPH LBB INIT. (FUTURE USE) P7#BI.03 220-250VDC	+ 5	- 6	/35.C2
BAY-419 3PH LBB INIT. (FUTURE USE) P7#BI.04 220-250VDC	+ 7	- 8	/35.C2
BAY-421 RPH LBB INIT. (FUTURE USE) P7#BI.05 220-250VDC	+ 9	- 10	/35.D2
BAY-421 YPH LBB INIT. (FUTURE USE) P7#BI.06 220-250VDC	+ 11	- 12	/35.D2
BAY-421 BPH LBB INIT. (FUTURE USE) P7#BI.07 220-250VDC	+ 13	- 14	/35.E2
BAY-421 3PH LBB INIT. (FUTURE USE) P7#BI.08 220-250VDC	+ 15	- 16	/35.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1
BIM
220-250VDC

-X72

SPARE P7#BI.09 220-250VDC	+ 1	- 2	/36.B2
SPARE P7#BI.10 220-250VDC	+ 3	- 4	/36.B2
SPARE P7#BI.11 220-250VDC	+ 5	- 6	/36.C2
BAY-427 3PH LBB INIT. (FUTURE USE) P7#BI.12 220-250VDC	+ 7	- 8	/36.C2
BAY-430 RPH LBB INIT. (FUTURE USE) P7#BI.13 220-250VDC	+ 9	- 10	/36.D2
BAY-430 YPH LBB INIT. (FUTURE USE) P7#BI.14 220-250VDC	+ 11	- 12	/36.D2
BAY-430 BPH LBB INIT. (FUTURE USE) P7#BI.15 220-250VDC	+ 13	- 14	/36.E2
BAY-430 3PH LBB INIT. (FUTURE USE) P7#BI.16 220-250VDC	+ 15	- 16	/36.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

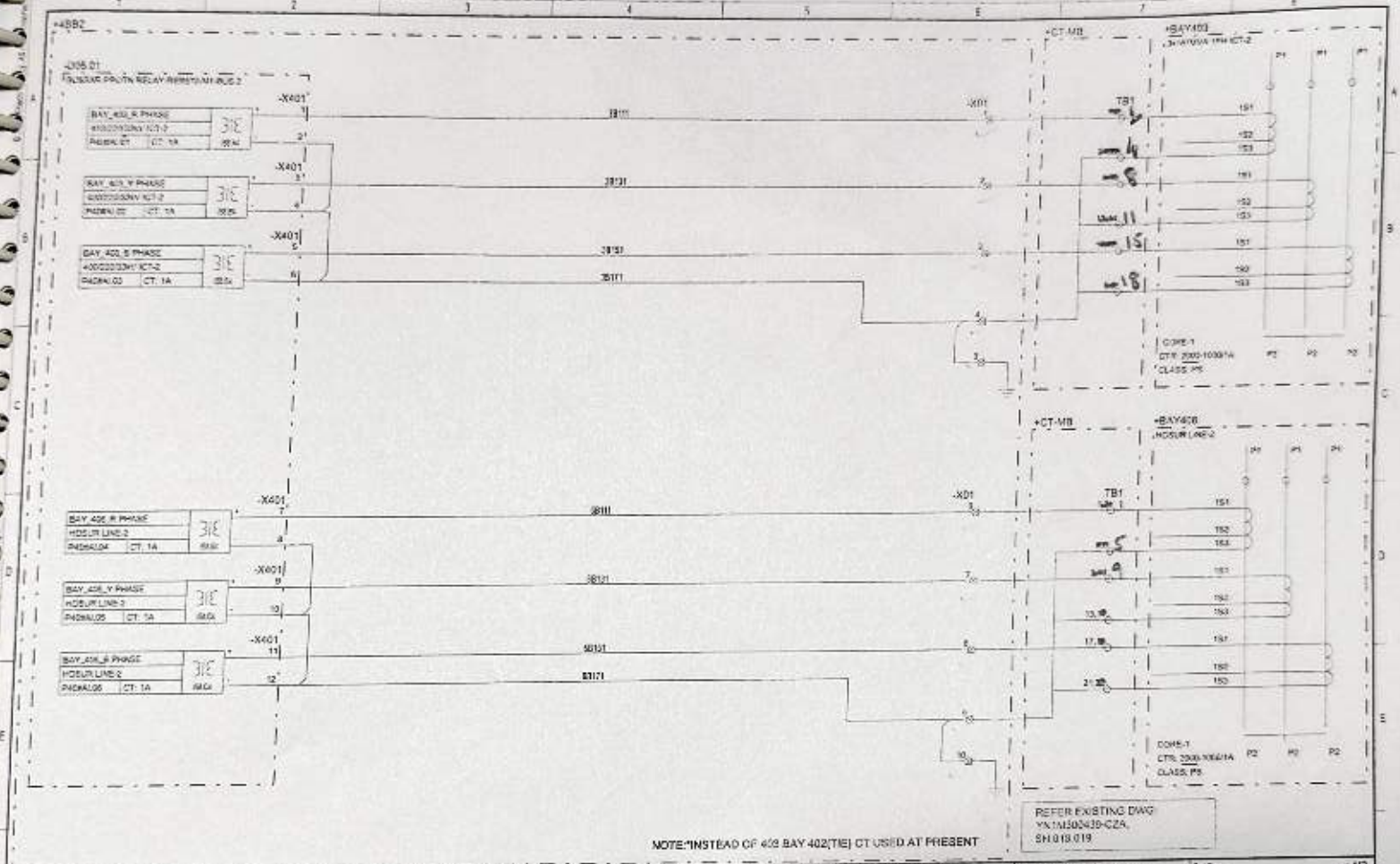
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 43
n. sheet 44

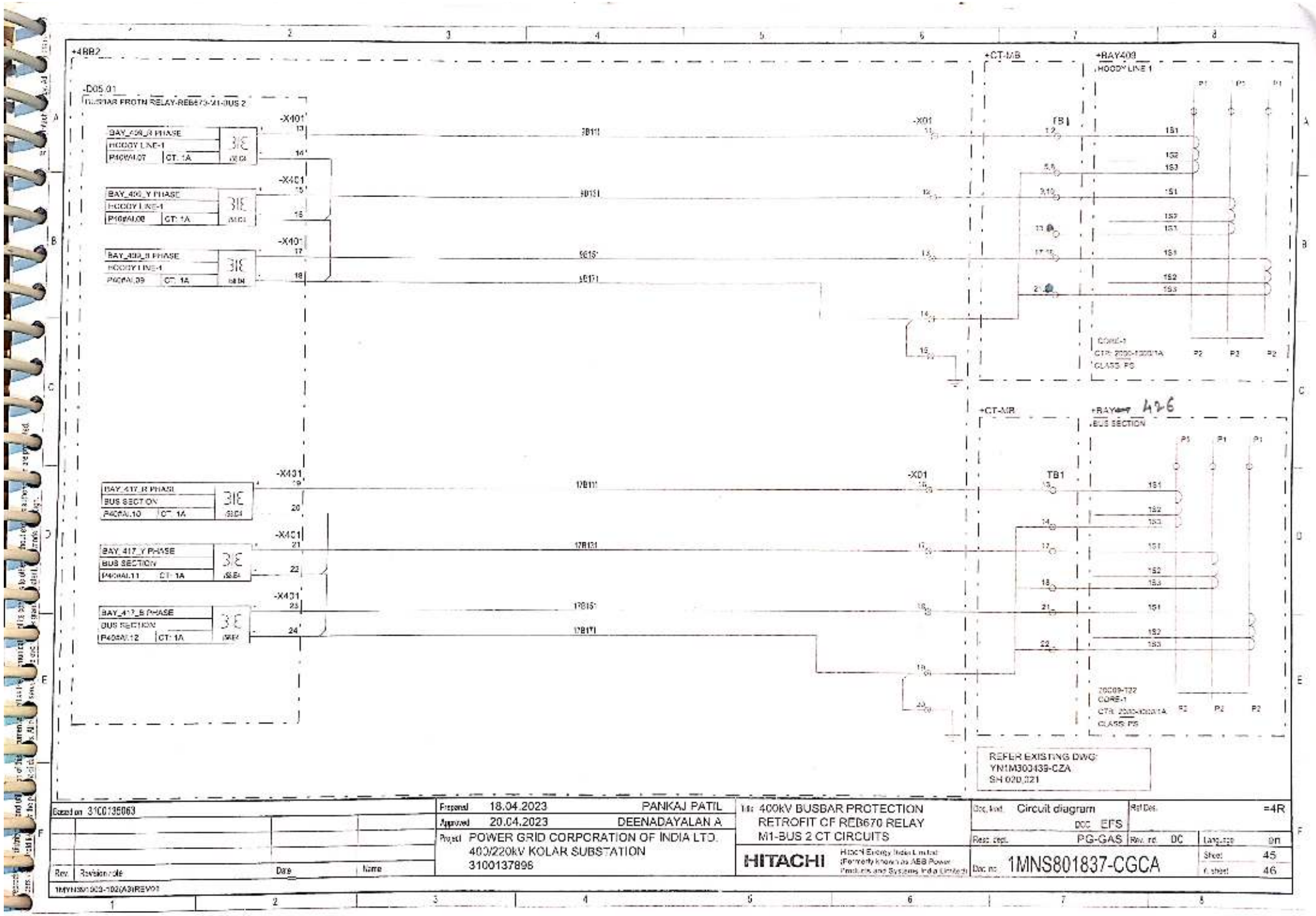
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Rel Dta	+4R
	Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp dept PG-GAS	Rev. ind. 00	Language en
		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA		Sheet 44 / Sheet 45
Rev. Amendments	Date Name				

Scanned with OKEN Scanner



Based on 3100136063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 CT CIRCUITS	Doc. kind Circuit diagram; doc EFS; Ref Des. =4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev. nr. 00; Lang. en
Rev. Revision note Date Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA; Sheet 45; C. sheet 46
1MYN300439-CZA(A3)REV01			

Scanned with OKEN Scanner

+4BE2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BAY_408_R PHASE		-X411	1
AC FILTER-1	3IE		2
P40R4L01	CT: 1A		
BAY_408_Y PHASE		-X411	3
AC FILTER-1	3IE		4
P40R4L02	CT: 1A		
BAY_408_B PHASE		-X411	5
AC FILTER-1	3IE		6
P40R4L03	CT: 1A		
BAY_426_R PHASE		-X411	7
CONVERTOR POLE-1	3IE		8
P42R4L04	CT: 1A		
BAY_426_Y PHASE		-X411	9
CONVERTOR POLE-1	3IE		10
P42R4L05	CT: 1A		
BAY_426_B PHASE		-X411	11
CONVERTOR POLE-1	3IE		12
P42R4L06	CT: 1A		

2B101
2B201
2B151
2B171
2B131
2B181
2B191
2B161

-X01

+CT-MB
+BAY408 4 1 8
AC FILTER-1
TB-1
P1 P1 P1
13 14 17 18 21 22
151 152 153 151 152 153 151 152 153
P2 P2 P2
2IC07-CT1
CORE-1
CTR: 3000/1A
CLASS: PS

+CT-MB
+BAY426 4 2 1
CONVERTOR POLE-1
TB-1
P1 P1 P1
13 14 17 18 21 22
151 152 153 151 152 153 151 152 153
P2 P2 P2
2IC08-CT1
CORE-1
CTR: 3000/1A
CLASS: PS

REFER EXISTING DWG:
YN1M300439-CZA,
SH:021_2,021_4

Based on 3100135053				Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RFB670 RELAY M1-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Ref Des =4R
				Approved 20.04.2023 DEENADAYALAN A		Doc dept PG-GAS	Rev. ind. 00 Language en
				Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and System India Limited)	Doc no 1MNS801837-CGCA	Sheet 46 / Subsheet 47
Rev.	Revs on note	Date	Name				

1MYN09 003-IC2(AS)REV01

Scanned with OKEN Scanner

Execution 3100135053	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 CT CIRCUITS	Doc.kind. Circuit diagram	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		acc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. | Revision note | Date | Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 47
1MYN801003-102(A)IREV07					n. sheet 48

© 2023 Hitachi Energy. All rights reserved.

+4BB2

FROM SH: 006/2

-X13

-813-01

-813-02

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

PSM
-X11

90-250VDC

PE
/58.B1

K301
+D.11-D11.02:1P3
/49.A5

K302
+B.05-1XX2:1
/49.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.131.101

1B	1A	
2B	2A	
3B	3A	/44.A4
4B	4A	/44.B4
5B	5A	/44.B4
6B	6A	/44.B4
7B	7A	/44.D4
8B	8A	/44.D4
9B	9A	/44.E4
10B	10A	/44.E4
11B	11A	/45.A4
12B	12A	/45.B4
13B	13A	/45.B4
14B	14A	/45.B4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.143.101

1B	1A	
2B	2A	
3B	3A	/45.D4
4B	4A	/45.D4
5B	5A	/45.E4
6B	6A	/45.E4
7B	7A	/46.A4
8B	8A	/46.B4
9B	9A	/46.B4
10B	10A	/46.B4
11B	11A	/46.D4
12B	12A	/46.D4
13B	13A	/46.E4
14B	14A	/46.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.155.101

1B	1A	
2B	2A	
3B	3A	/47.A4
4B	4A	/47.B4
5B	5A	/47.B4
6B	6A	/47.B4
7B	7A	/47.D4
8B	8A	/47.D4
9B	9A	/47.E4
10B	10A	/47.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 023

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
	DCC EFS		
Resp. dept.	PG-GAS	Rev. ind.	01
Doc. no.	1MNS801837-CGCA	Language	en
		Sheet	48
		n. sheet	49

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

MAIN 1 BUS 2 PROT IN		-X31 1	K303
P3#BI.01	220-250VDC	/59.A2 2	
MAIN 1 BUS 2 PROT OUT		-X31 3	K304
P3#BI.02	220-250VDC	/59.B2 4	
SPARE		-X31 5	K305
P3#BI.03	220-250VDC	/59.B2 6	
TRIP RELAY RESET 96A BUS-2		-X31 7	K306
P3#BI.04	220-250VDC	/59.B2 8	
SPARE		-X31 9	K307
P3#BI.05	220-250VDC	/59.C2 10	
SPARE		-X31 11	K308
P3#BI.06	220-250VDC	/59.C2 12	
SPARE		-X31 13	K309
P3#BI.07	220-250VDC	/59.C2 14	
REB670 RELAY FAULTY BUS 2 - MAIN 2		-X31 15	K310
P3#BI.08	220-250VDC	/59.D2 16	

-1XX2 1

+D.05-D05.01:5 (-X11) /48.B2 K302

+D.05-D05.01:4 (-X11) /48.B2 K301

-D11.02
1P3 1P4 /49.B7 IN
BB-2 M1 IN/OUT SWITCH

-D11.02
1P2 /49.A7 OUT 1P1
BB-2 M1 IN/OUT SWITCH

-2X04
1 K301 /170.B8
2 K306 /170.A5 +D.13-D13.101.101:221
3
4
5
-X14A 1
-X14A 2

-D11.02
1P2 1P1 /49.B4 C
1P3 1P4 /49.B3 A
2P2 2P1 C
2P3 2P4 A
3P2 3P1 C
3P3 3P4 A
4P2 4P1 C
4P3 4P4 A
IN A
OUT C
BB-2 M1 IN/OUT SWITCH

+4BB6
+D.05
-X14A 1
-X14A 2
-X11 2
3
1
/130.B2
BB RELAY FAULTY
BUS-2 MAIN-2

NOTE:
2X04 TB GROUP
TO BE ADDED NEW

+B.05-1XX2:2 /50.A3 K302

+B.17-X04:13 /50.A5 K301

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

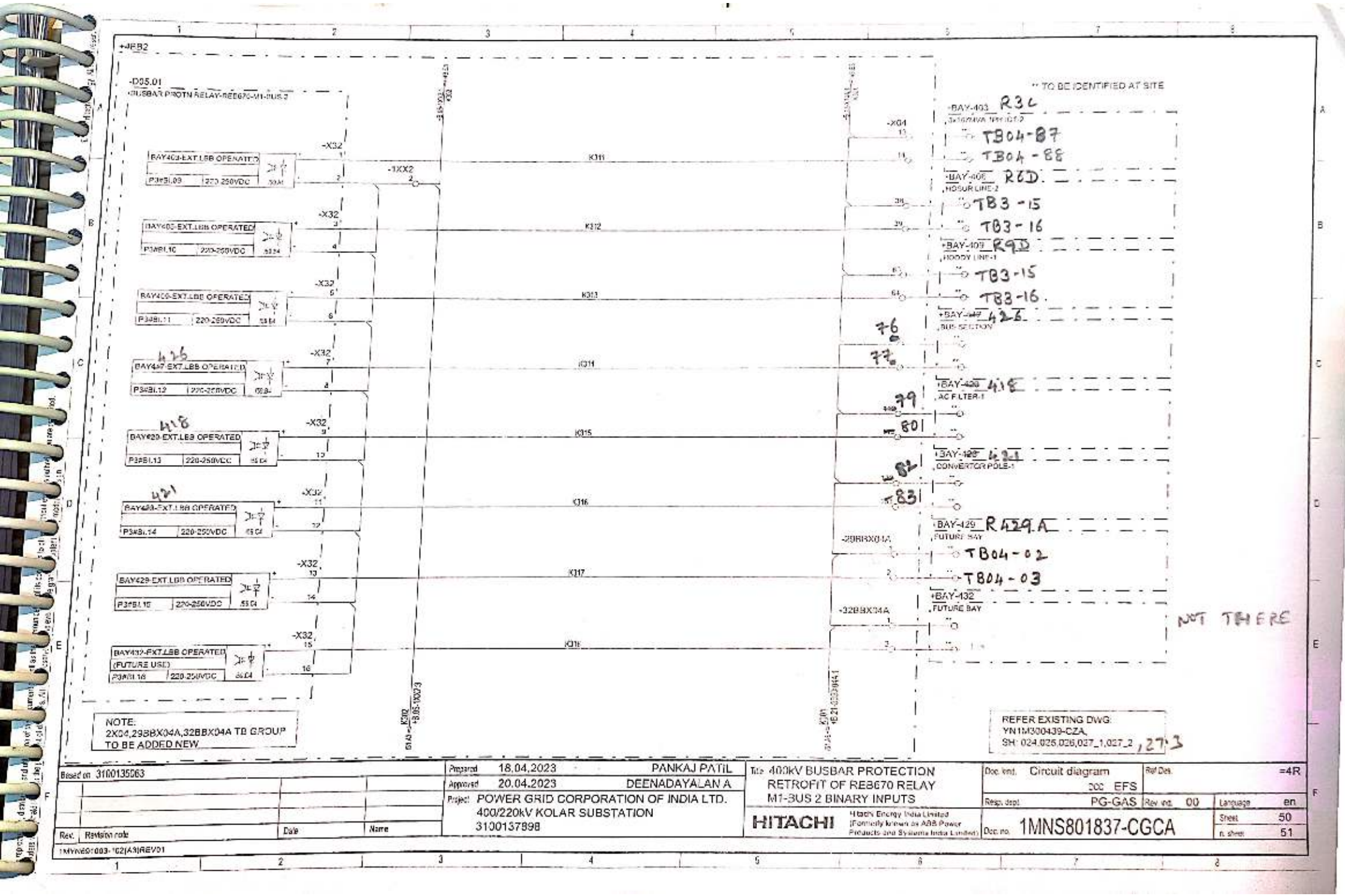
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

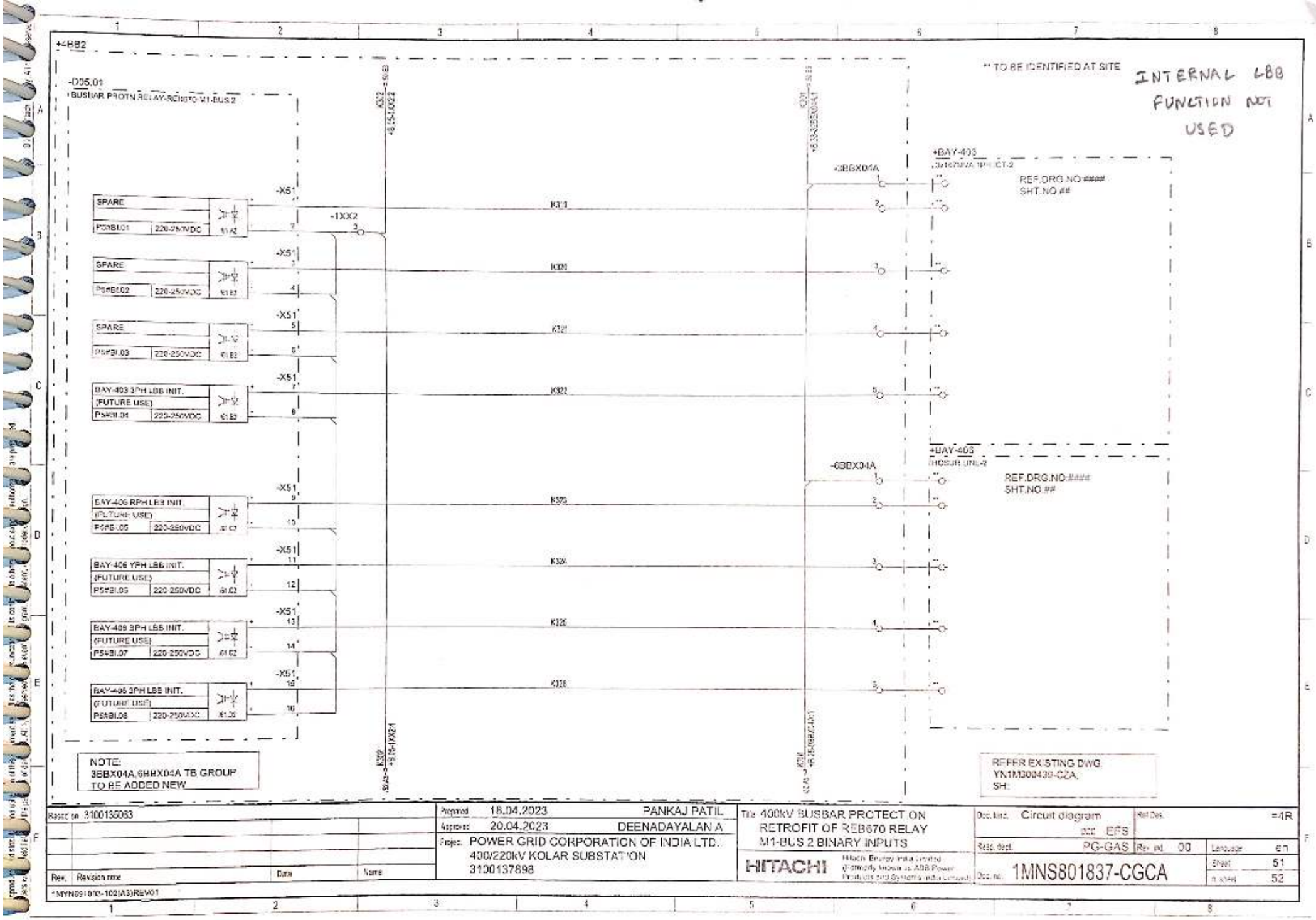
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

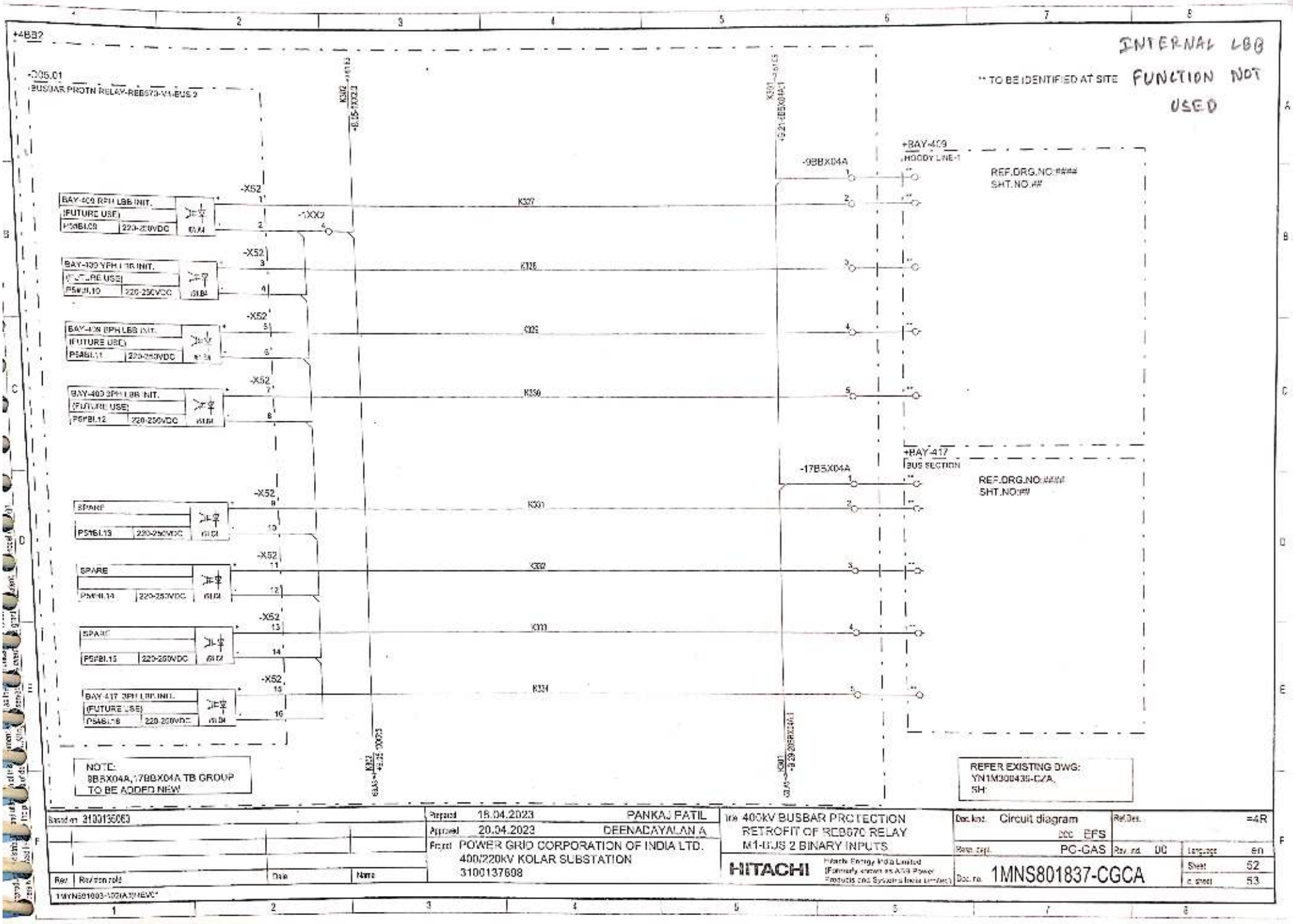
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 49
Doc. no. 1MNS801837-CGCA
n. sheet 50

1MYN691003-102(A3)REV01

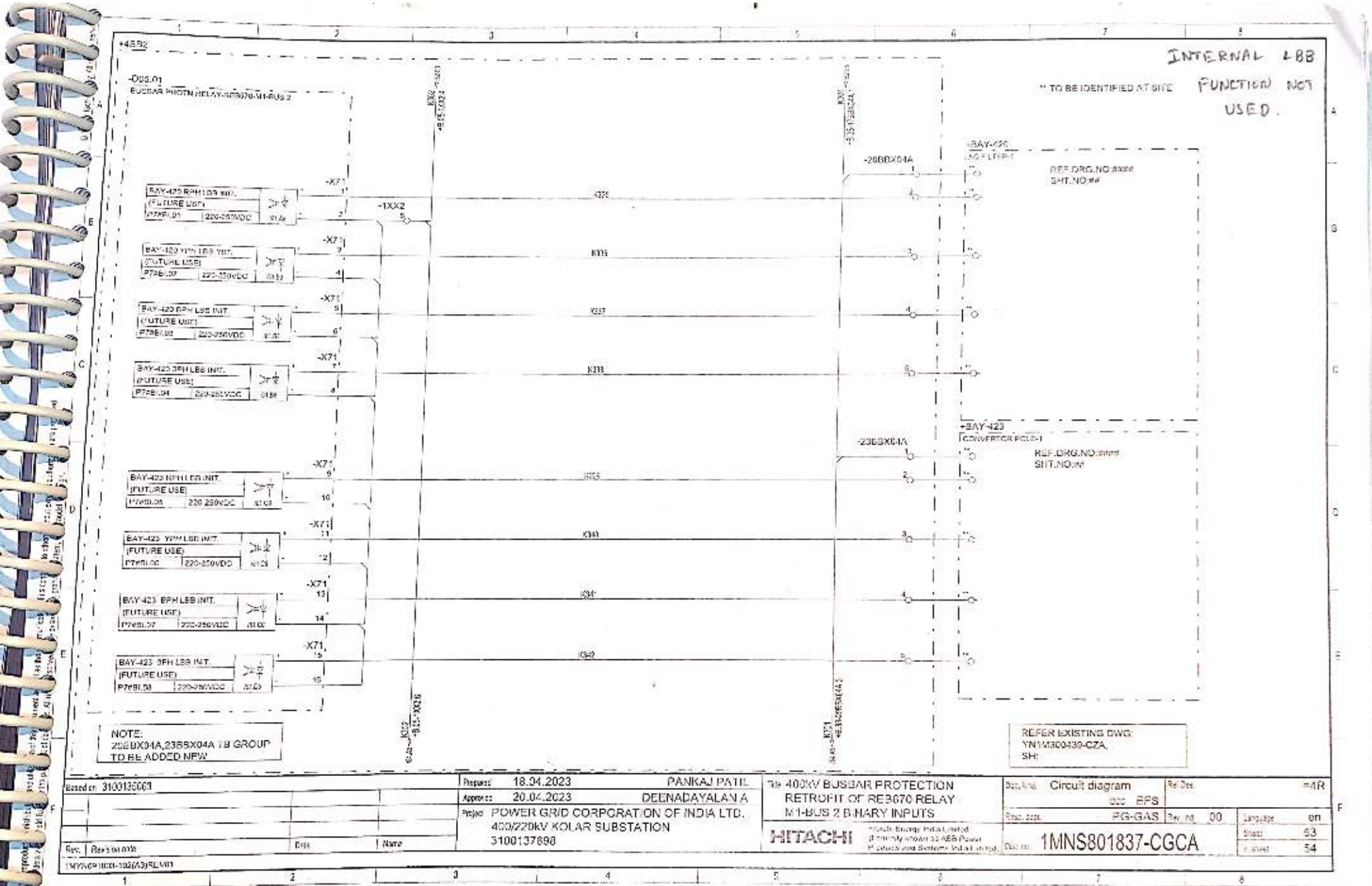

+JFB2
-D05.01
-BUSBAR PROTN RELAY-RE8670-M1-BUS 2
-X32
-1XX2
BAY403-EXT.LBB OPERATED
BAY402-EXT.LBB OPERATED
BAY401-EXT.LBB OPERATED
BAY427-EXT.LBB OPERATED
BAY428-EXT.LBB OPERATED
BAY429-EXT.LBB OPERATED
BAY432-EXT.LBB OPERATED
(FUTURE USE)
P3#BI.09
P3#BI.10
P3#BI.11
P3#BI.12
P3#BI.13
P3#BI.14
P3#BI.15
P3#BI.16
220-250VDC
K311
K312
K313
K314
K315
K316
K317
K318
** TO BE IDENTIFIED AT SITE
-BAY-403 R3C
TB04-87
TB04-88
-BAY-402 R2D
HOSUR LINE-2
TB3-15
TB3-16
-BAY-401 R1D
HOODY LINE-1
TB3-15
TB3-16
-BAY-427 426
BUS SECTION
-BAY-428 418
AC FILTER-1
-BAY-429 421
CONVERTOR POLE-1
-BAY-429 R429A
FUTURE BAY
TB04-02
TB04-03
-29BBX04A
-BAY-432
FUTURE BAY
-32BBX04A
NOT THERE
NOTE:
2X04,29BBX04A,32BBX04A TB GROUP
TO BE ADDED NEW
REFER EXISTING DWG:
YN1M300439-CZA_
SH: 024,025,026,027_1,027_2
Based on 3100135063
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project: POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137998
Title: 400kV BUSBAR PROTECTION
RETROFIT OF RE8670 RELAY
M1-BUS 2 BINARY INPUTS
HITACHI
Hitachi Energy India Limited
(Formerly known as ABB Power
Products and Systems India Limited)
Doc kind: Circuit diagram
200 EFS
Ref Des. =4R
Resp. dept. PG-GAS
Rev. ind. 00
Language en
Doc. no. 1MNS801837-CGCA
Sheet 50
n. sheet 51
Rev. Revision note
Date
Name
1MYW601003-1C2(A3)REV01



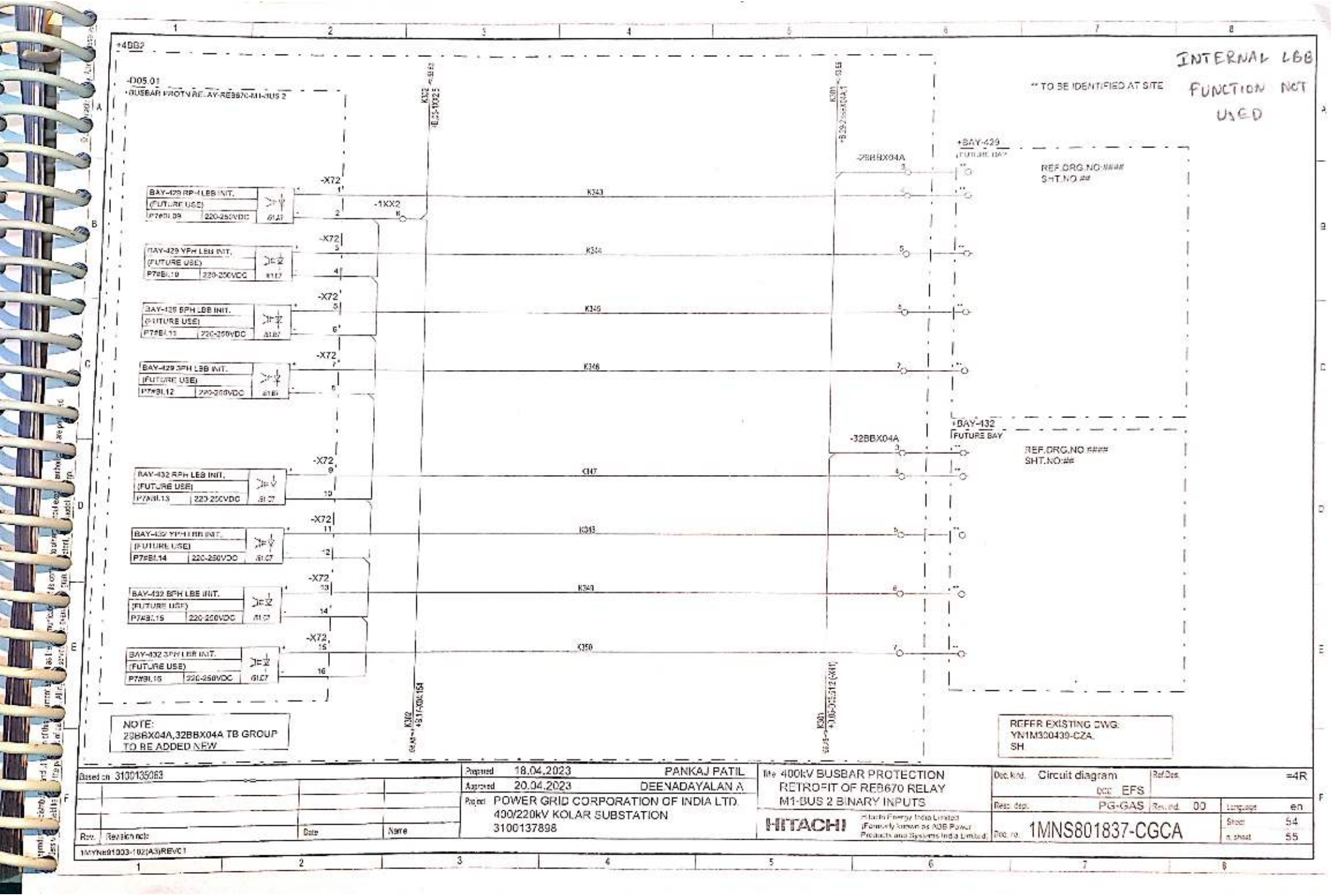
Scanned with OKEN Scanner



Scanned with OKEN Scanner

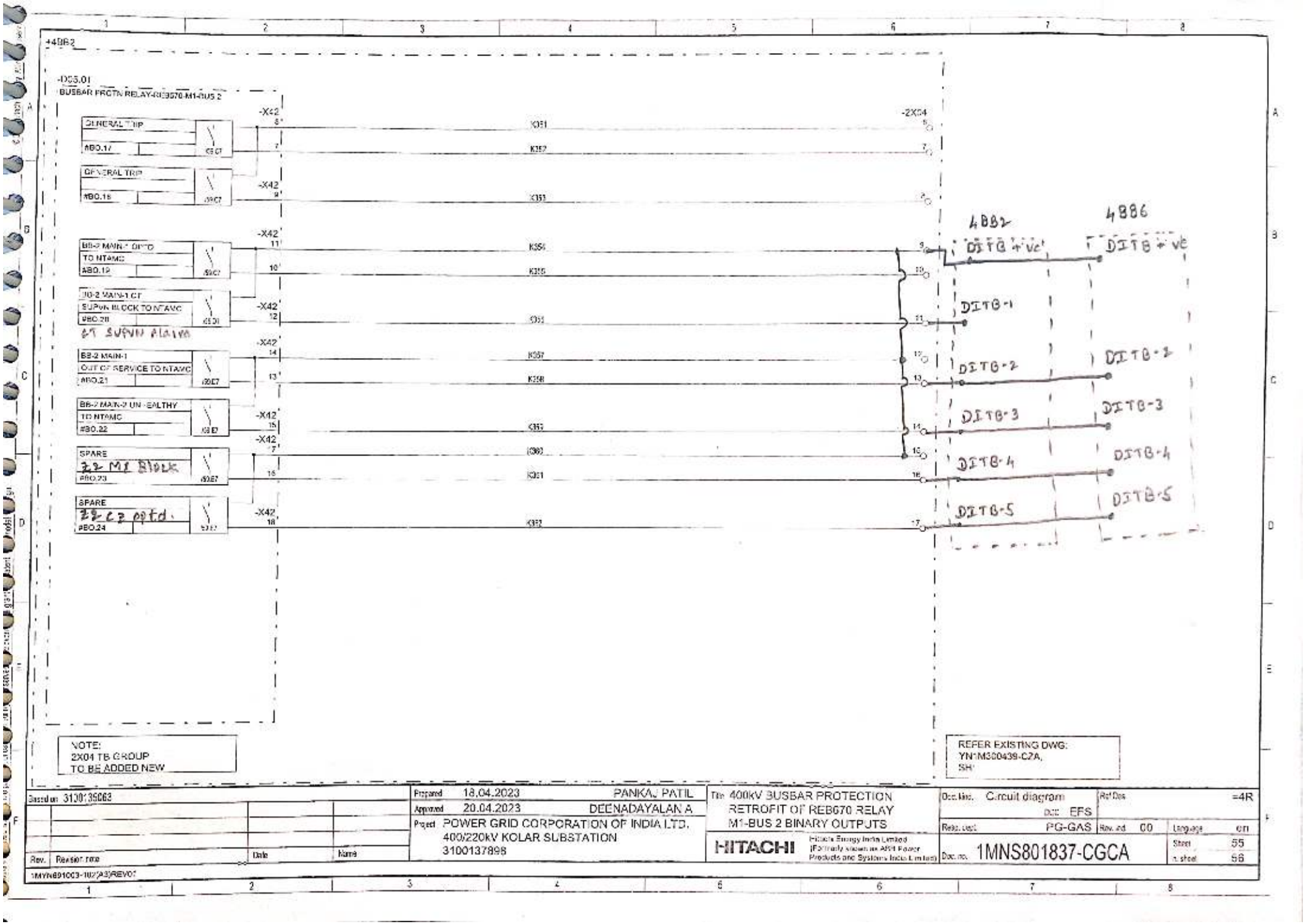


Scanned with OKEN Scanner

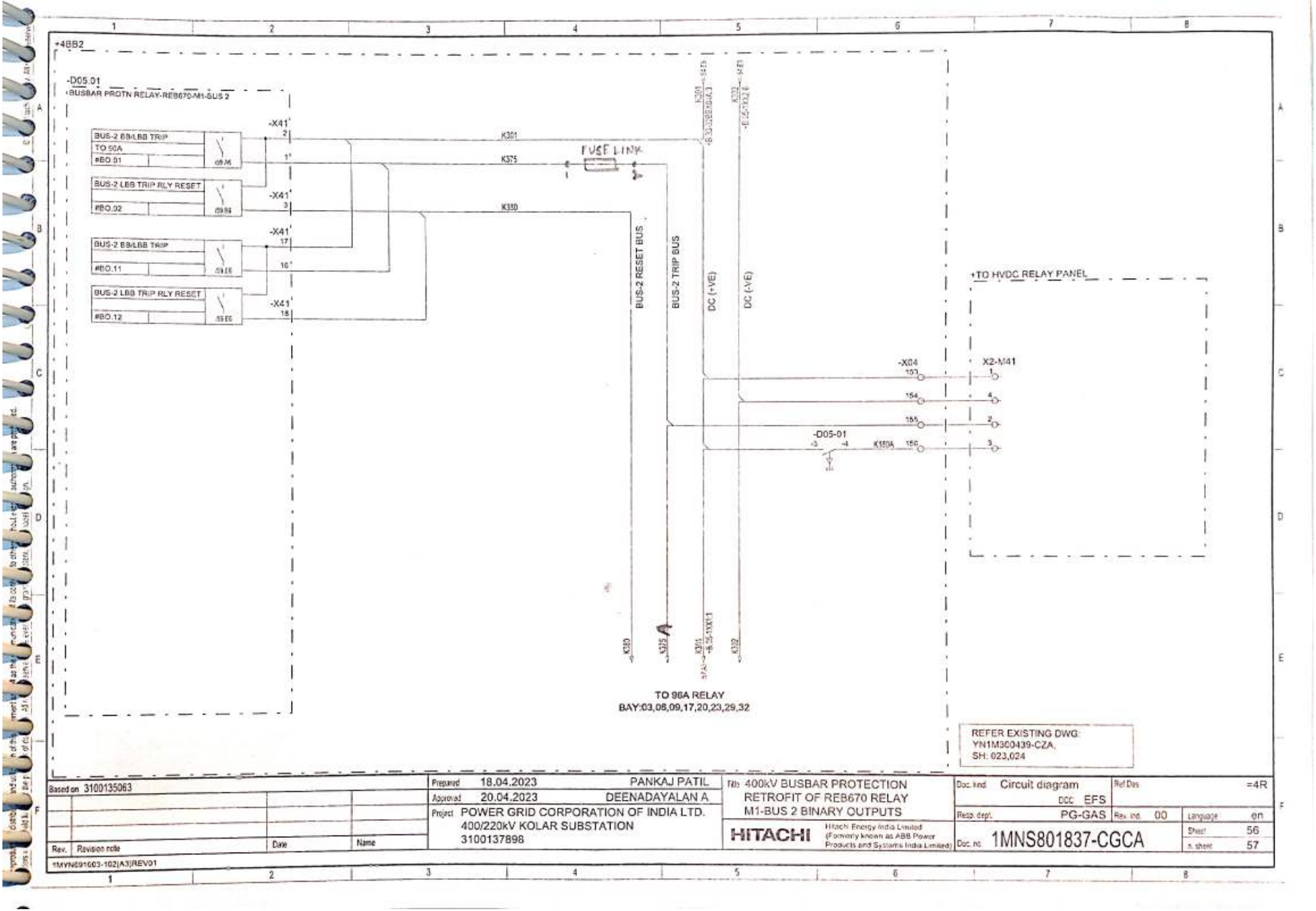


Based on 3100135083	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RE8670 RELAY M1-BUS 2 BINARY INPUTS	Doc.kind. Circuit diagram; doc. EFS; Ref.Des. =4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev.ind. 00; Language en
Rev. Revision note Date Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA; Sheet 54; n. sheet 55
1MYNe81033-102(A3)REV01			

Scanned with OKEN Scanner



Scanned with OKEN Scanner



Based on 3100135063			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 BINARY OUTPUTS	Doc. kind Circuit diagram DCC EFS	Ref Des	=4R
			Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. nr. 1MNS801837-CGCA		Sheet 56
Rev.	Revision note	Date	Name				n. sheet 57

1MYN691603-102(A3)REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BAY-403 LBB RETRIP-M1	#BO.03	/59.B6	-X41 5	-1XX1 1	2P13
			-X41 4		
BAY-406 RPH LBB RETRIP-M1	#BO.04	/59.C6	-X41 6		2P15
BAY-406 YPH LBB RETRIP-M1	#BO.05	/59.C6	-X41 8		2P17
			-X41 7		
BAY-406 BPH LBB RETRIP-M1	#BO.06	/59.C6	-X41 9		2P19
BAY-409 RPH LBB RETRIP-M1	#BO.07	/59.C6	-X41 11	-1XX1 2	2P21
			-X41 10		
BAY-409 YPH LBB RETRIP-M1	#BO.08	/59.D6	-X41 12		2P23
BAY-409 BPH LBB RETRIP-M1	#BO.09	/59.D6	-X41 14		2P25
			-X41 13		
BAY-417 LBB RETRIP-M1	#BO.10	/59.E6	-X41 15		2P27

K301 /56.E5 -D05-01:-3

-2X04 18 19 20 21 22 23 24 25

NOTE:
1XX1, 2X04 TB GROUP
TO BE ADDED NEW

K301 /57.A6 +B.05-1XX1:3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BAY-420 RPH LBB RETRIP-M1	#BO.01	/60.A2	-X61 2	-1XX1 3	2P29
			-X61 1		
BAY-420 YPH LBB RETRIP-M1	#BO.02	/60.B2	-X61 3		2P31
BAY-420 BPH LBB RETRIP-M1	#BO.03	/60.B2	-X61 5		2P33
			-X61 4		
BAY-423 RPH LBB RETRIP-M1	#BO.04	/60.C2	-X61 6		2P35
BAY-423 YPH LBB RETRIP-M1	#BO.05	/60.C2	-X61 8	-1XX1 4	2P37
			-X61 7		
BAY-423 BPH LBB RETRIP-M1	#BO.06	/60.C2	-X61 9		2P39
BAY-420 BPH LBB RETRIP-M1	#BO.07	/60.C2	-X61 11		2P41
			-X61 10		
BAY-429 RPH LBB RETRIP-M1	#BO.08	/60.D2	-X61 12		2P43
BAY-429 YPH LBB RETRIP-M1	#BO.09	/60.D2	-X61 14	-1XX1 5	2P45
			-X61 13		
BAY-429 BPH LBB RETRIP-M1	#BO.10	/60.E2	-X61 15		2P47
BAY-432 RPH LBB RETRIP-M1	#BO.11	/60.E2	-X61 17		2P49
			-X61 16		
BAY-432 YPH LBB RETRIP-M1	#BO.12	/60.E2	-X61 18		2P51
BAY-432 BPH LBB RETRIP-M1	#BO.13	/60.A4	X62 2	-1XX1 6	2P53
			X62 1		

K301 /57.E3 +B.05-1XX1:2

-2X04 26 27 28 29 30 31 32 33 34 35 36 37 38

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 57
n. sheet 58
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
PSM
90-250VDC

-X11

4 +
5 -
/48.B3
90-250VDC
PE

-X11
2
3 /121.E7
1

BUSBAR RELAY FAULTY
BUS-2 MAIN1

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
TRM
1A, 50/60Hz

-X401

BAY_403_R PHASE 400/220/33kV ICT-2 P40#AI.01 CT: 1A	+ 1 - 2	/44.A2	BAY_420_R PHASE AC FILTER-1 P40#AI.01 CT: 1A	+ 1 - 2	/46.A2
BAY_403_Y PHASE 400/220/33kV ICT-2 P40#AI.02 CT: 1A	+ 3 - 4	/44.B2	BAY_420_Y PHASE AC FILTER-1 P40#AI.02 CT: 1A	+ 3 - 4	/46.B2
BAY_403_B PHASE 400/220/33kV ICT-2 P40#AI.03 CT: 1A	+ 5 - 6	/44.B2	BAY_420_B PHASE AC FILTER-1 P40#AI.03 CT: 1A	+ 5 - 6	/46.B2
BAY_406_R PHASE HOSUR LINE-2 P40#AI.04 CT: 1A	+ 7 - 8	/44.D2	BAY_423_R PHASE CONVERTOR POLE-1 P40#AI.04 CT: 1A	+ 7 - 8	/46.D2
BAY_406_Y PHASE HOSUR LINE-2 P40#AI.05 CT: 1A	+ 9 - 10	/44.D2	BAY_423_Y PHASE CONVERTOR POLE-1 P40#AI.05 CT: 1A	+ 9 - 10	/46.D2
BAY_406_B PHASE HOSUR LINE-2 P40#AI.06 CT: 1A	+ 11 - 12	/44.E2	BAY_423_B PHASE CONVERTOR POLE-1 P40#AI.06 CT: 1A	+ 11 - 12	/46.E2
BAY_409_R PHASE HOODY LINE-1 P40#AI.07 CT: 1A	+ 13 - 14	/45.A2	BAY_429_R PHASE FUTURE BAY P40#AI.07 CT: 1A	+ 13 - 14	/47.A2
BAY_409_Y PHASE HOODY LINE-1 P40#AI.08 CT: 1A	+ 15 - 16	/45.B2	BAY_429_Y PHASE FUTURE BAY P40#AI.08 CT: 1A	+ 15 - 16	/47.B2
BAY_409_B PHASE HOODY LINE-1 P40#AI.09 CT: 1A	+ 17 - 18	/45.B2	BAY_429_B PHASE FUTURE BAY P40#AI.09 CT: 1A	+ 17 - 18	/47.B2
BAY_417_R PHASE BUS SECTION P40#AI.10 CT: 1A	+ 19 - 20	/45.D2	BAY_432_R PHASE FUTURE BAY P40#AI.10 CT: 1A	+ 19 - 20	/47.D2
BAY_417_Y PHASE BUS SECTION P40#AI.11 CT: 1A	+ 21 - 22	/45.D2	BAY_432_Y PHASE FUTURE BAY P40#AI.11 CT: 1A	+ 21 - 22	/47.D2
BAY_417_B PHASE BUS SECTION P40#AI.12 CT: 1A	+ 23 - 24	/45.E2	BAY_432_B PHASE FUTURE BAY P40#AI.12 CT: 1A	+ 23 - 24	/47.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
TRM
1A, 50/60Hz

-X411

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

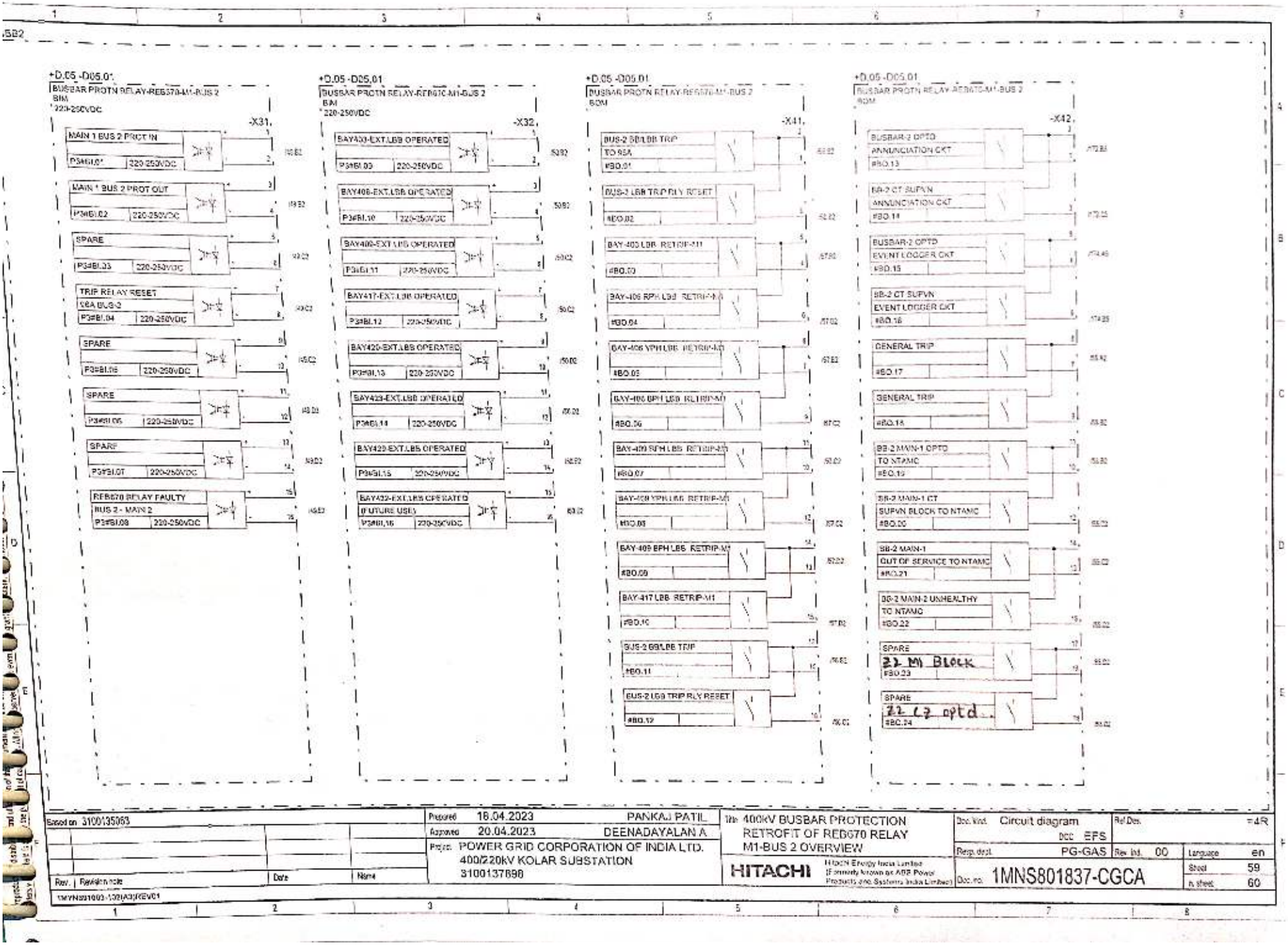
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	58
		n. sheet	59

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW	Doc. kind Circuit diagram	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		Doc. EFS		
	Proj.no. POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp.dept. PG-GAS	Rev.ind. 00	Language en
			Doc.no. 1MNS801837-CGCA	Sheet 59	
Rev. Revision note Date Name				n.sheet 60	

1MYN301003-1001/A3/REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
BOM

-X61

BAY-420 RPH LBB RETRIP-M1	#BO.01	2 / 1	/57.B5
BAY-420 YPH LBB RETRIP-M1	#BO.02	3	/57.B5
BAY-420 BPH LBB RETRIP-M1	#BO.03	5 / 4	/57.B5
BAY-423 RPH LBB RETRIP-M1	#BO.04	6	/57.C5
BAY-423 YPH LBB RETRIP-M1	#BO.05	8 / 7	/57.C5
BAY-423 BPH LBB RETRIP-M1	#BO.06	9	/57.C5
BAY-420 BPH LBB RETRIP-M1	#BO.07	11 / 10	/57.D5
BAY-429 RPH LBB RETRIP-M1	#BO.08	12	/57.D5
BAY-429 YPH LBB RETRIP-M1	#BO.09	14 / 13	/57.D5
BAY-429 BPH LBB RETRIP-M1	#BO.10	15	/57.E5
BAY-432 RPH LBB RETRIP-M1	#BO.11	17 / 16	/57.E5
BAY-432 YPH LBB RETRIP-M1	#BO.12	18	/57.E5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2
BOM

X62

BAY-432 BPH LBB RETRIP-M1	#BO.13	2 / 1	/57.F5
SPARE	#BO.14	3	
BUSBAR-2 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/174.B6
BB-2 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/174.B6
SPARE	#BO.17	8 / 7	
SPARE	#BO.18	9	
SPARE	#BO.19	11 / 10	
SPARE	#BO.20	12	
SPARE	#BO.21	14 / 13	
SPARE	#BO.22	15	
SPARE	#BO.23	17 / 16	
SPARE	#BO.24	18	

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 60
n. sheet 61

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X51

SPARE		+ 1		
P5#BI.01	220-250VDC	- 2	/51.B2	
SPARE		+ 3		
P5#BI.02	220-250VDC	- 4	/51.B2	
SPARE		+ 5		
P5#BI.03	220-250VDC	- 6	/51.C2	
BAY-403 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P5#BI.04	220-250VDC	- 8	/51.C2	
BAY-406 RPH LBB INIT.		+ 9		
(FUTURE USE)				
P5#BI.05	220-250VDC	- 10	/51.D2	
BAY-406 YPH LBB INIT.		+ 11		
(FUTURE USE)				
P5#BI.06	220-250VDC	- 12	/51.D2	
BAY-406 BPH LBB INIT.		+ 13		
(FUTURE USE)				
P5#BI.07	220-250VDC	- 14	/51.E2	
BAY-406 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P5#BI.08	220-250VDC	- 16	/51.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X52

BAY-409 RPH LBB INIT.		+ 1		
(FUTURE USE)				
P5#BI.09	220-250VDC	- 2	/52.B2	
BAY-409 YPH LBB INIT.		+ 3		
(FUTURE USE)				
P5#BI.10	220-250VDC	- 4	/52.B2	
BAY-409 BPH LBB INIT.		+ 5		
(FUTURE USE)				
P5#BI.11	220-250VDC	- 6	/52.C2	
BAY-409 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P5#BI.12	220-250VDC	- 8	/52.C2	
SPARE		+ 9		
P5#BI.13	220-250VDC	- 10	/52.D2	
SPARE		+ 11		
P5#BI.14	220-250VDC	- 12	/52.D2	
SPARE		+ 13		
P5#BI.15	220-250VDC	- 14	/52.E2	
BAY-417 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P5#BI.16	220-250VDC	- 16	/52.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X71

BAY-420 RPH LBB INIT.		+ 1		
(FUTURE USE)				
P7#BI.01	220-250VDC	- 2	/53.B2	
BAY-420 YPH LBB INIT.		+ 3		
(FUTURE USE)				
P7#BI.02	220-250VDC	- 4	/53.B2	
BAY-420 BPH LBB INIT.		+ 5		
(FUTURE USE)				
P7#BI.03	220-250VDC	- 6	/53.C2	
BAY-420 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P7#BI.04	220-250VDC	- 8	/53.C2	
BAY-423 RPH LBB INIT.		+ 9		
(FUTURE USE)				
P7#BI.05	220-250VDC	- 10	/53.D2	
BAY-423 YPH LBB INIT.		+ 11		
(FUTURE USE)				
P7#BI.06	220-250VDC	- 12	/53.D2	
BAY-423 BPH LBB INIT.		+ 13		
(FUTURE USE)				
P7#BI.07	220-250VDC	- 14	/53.E2	
BAY-423 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P7#BI.08	220-250VDC	- 16	/53.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 2
BIM
220-250VDC

-X72

BAY-429 RPH LBB INIT.		+ 1		
(FUTURE USE)				
P7#BI.09	220-250VDC	- 2	/54.B2	
BAY-429 YPH LBB INIT.		+ 3		
(FUTURE USE)				
P7#BI.10	220-250VDC	- 4	/54.B2	
BAY-429 BPH LBB INIT.		+ 5		
(FUTURE USE)				
P7#BI.11	220-250VDC	- 6	/54.C2	
BAY-429 3PH LBB INIT.		+ 7		
(FUTURE USE)				
P7#BI.12	220-250VDC	- 8	/54.C2	
BAY-432 RPH LBB INIT.		+ 9		
(FUTURE USE)				
P7#BI.13	220-250VDC	- 10	/54.D2	
BAY-432 YPH LBB INIT.		+ 11		
(FUTURE USE)				
P7#BI.14	220-250VDC	- 12	/54.D2	
BAY-432 BPH LBB INIT.		+ 13		
(FUTURE USE)				
P7#BI.15	220-250VDC	- 14	/54.E2	
BAY-432 3PH LBB INIT.		+ 15		
(FUTURE USE)				
P7#BI.16	220-250VDC	- 16	/54.E2	

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

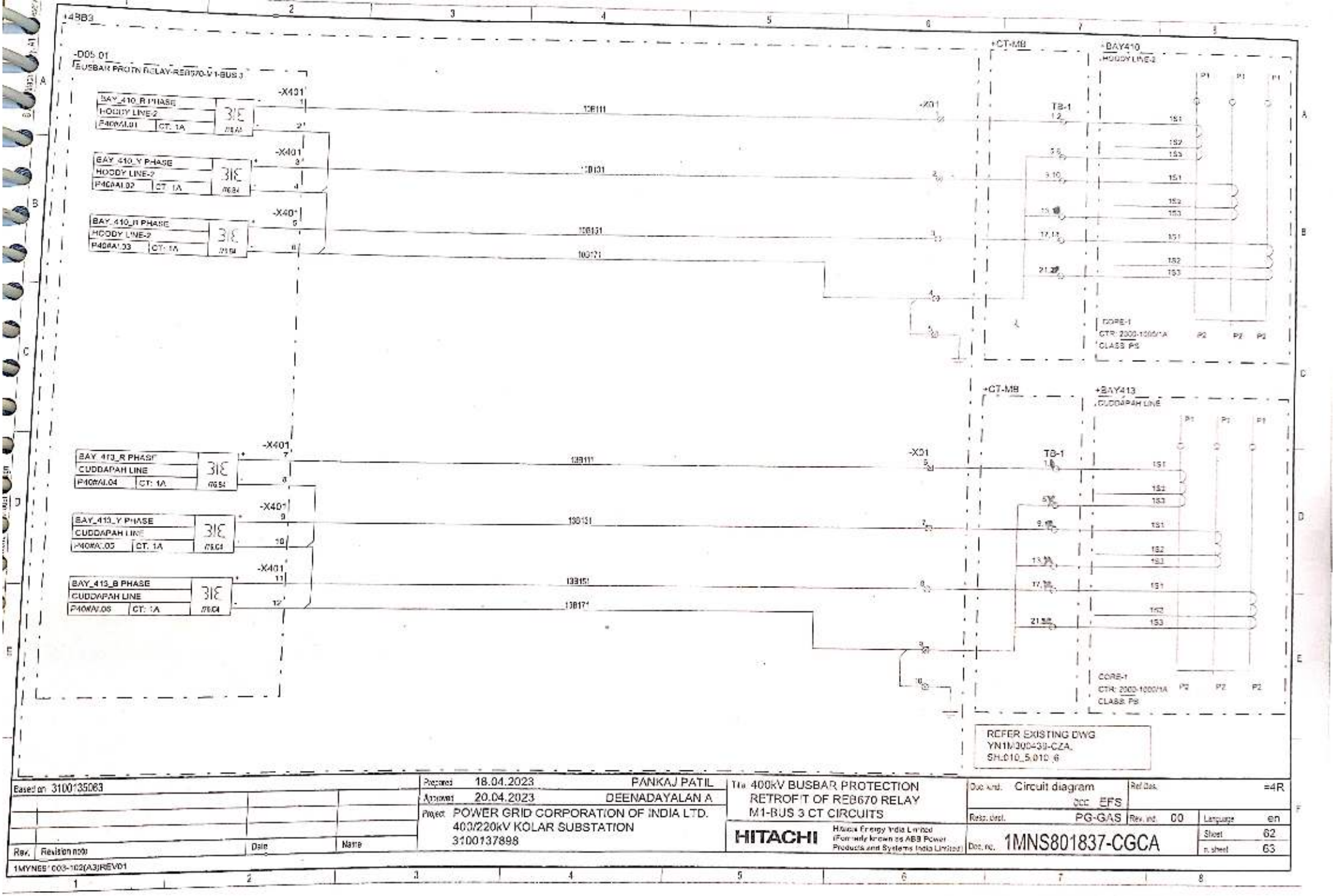
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 61
n. sheet 62

1MYN691003-102(A3)REV01

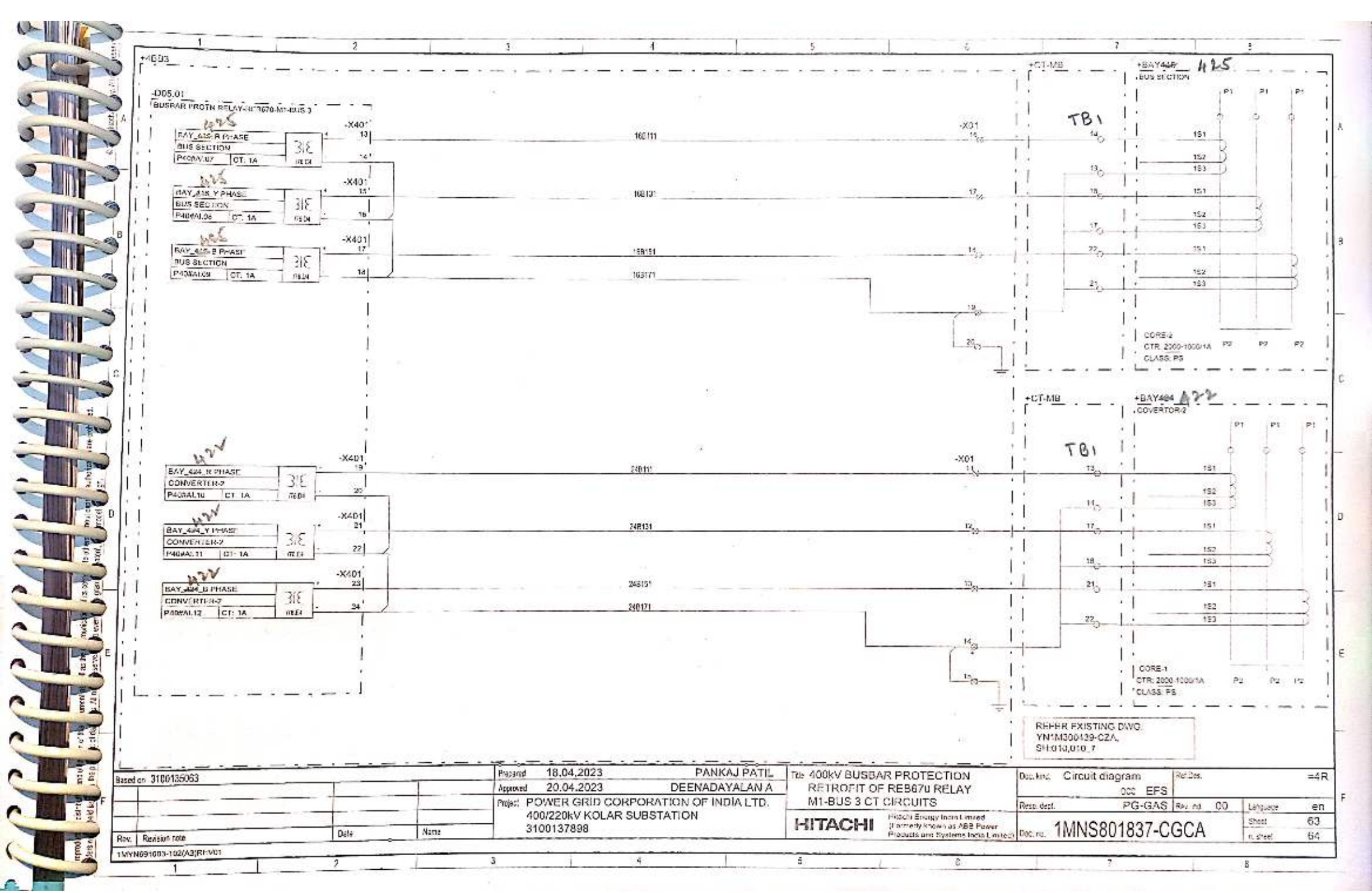
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



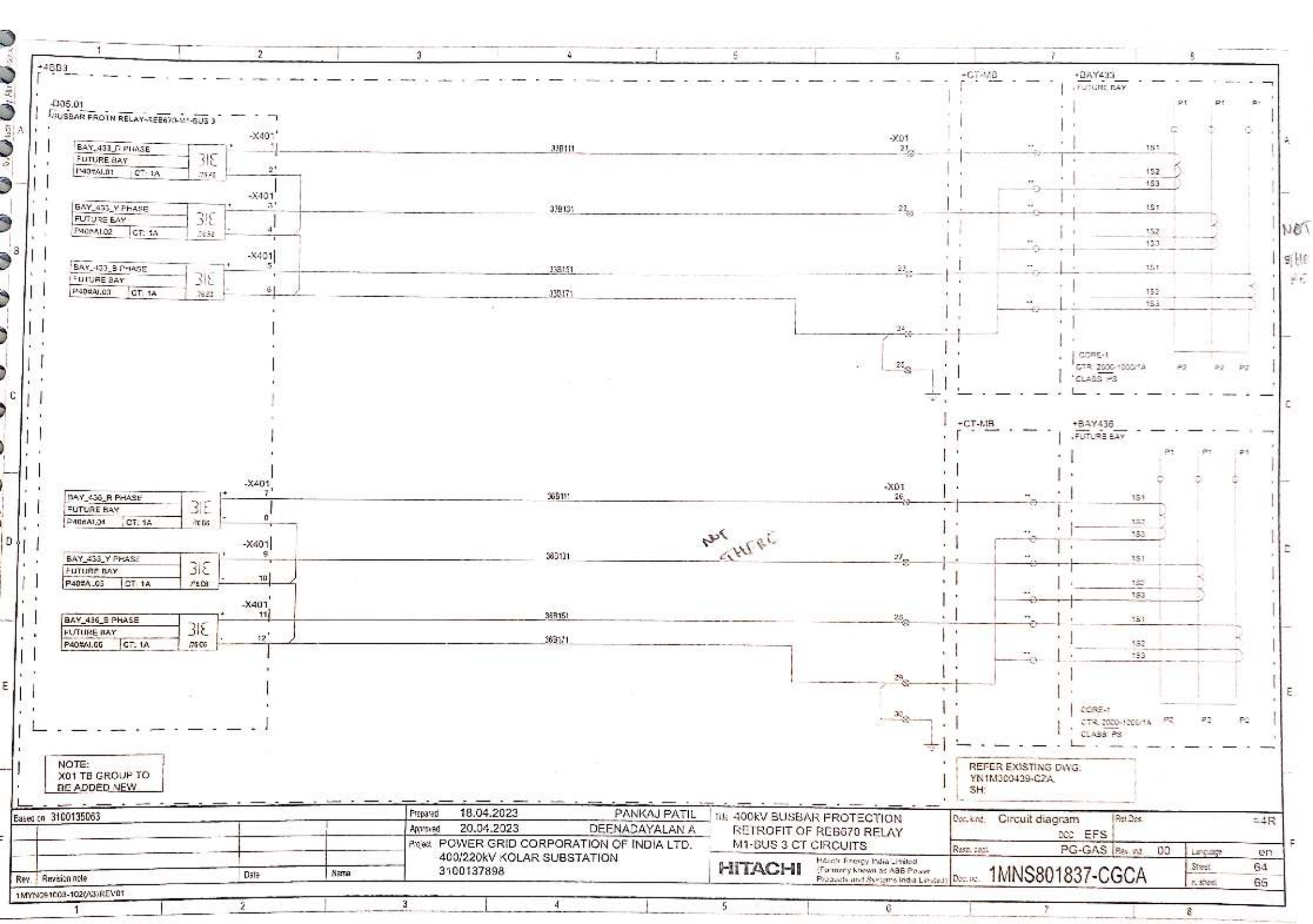
Based on 3100135083			Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 CT CIRCUITS	Doc kind Circuit diagram	Ref des. =4R
			Approved 20.04.2023	DEENADAYALAN A		acc. EFS	
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp. dept. PG-GAS	Rev. ind. 00
Rev.	Revision note	Date	Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Language en
							Sheet 62
							n. sheet 63

1MYN5**003-102(A3)REV01

Scanned with OKEN Scanner

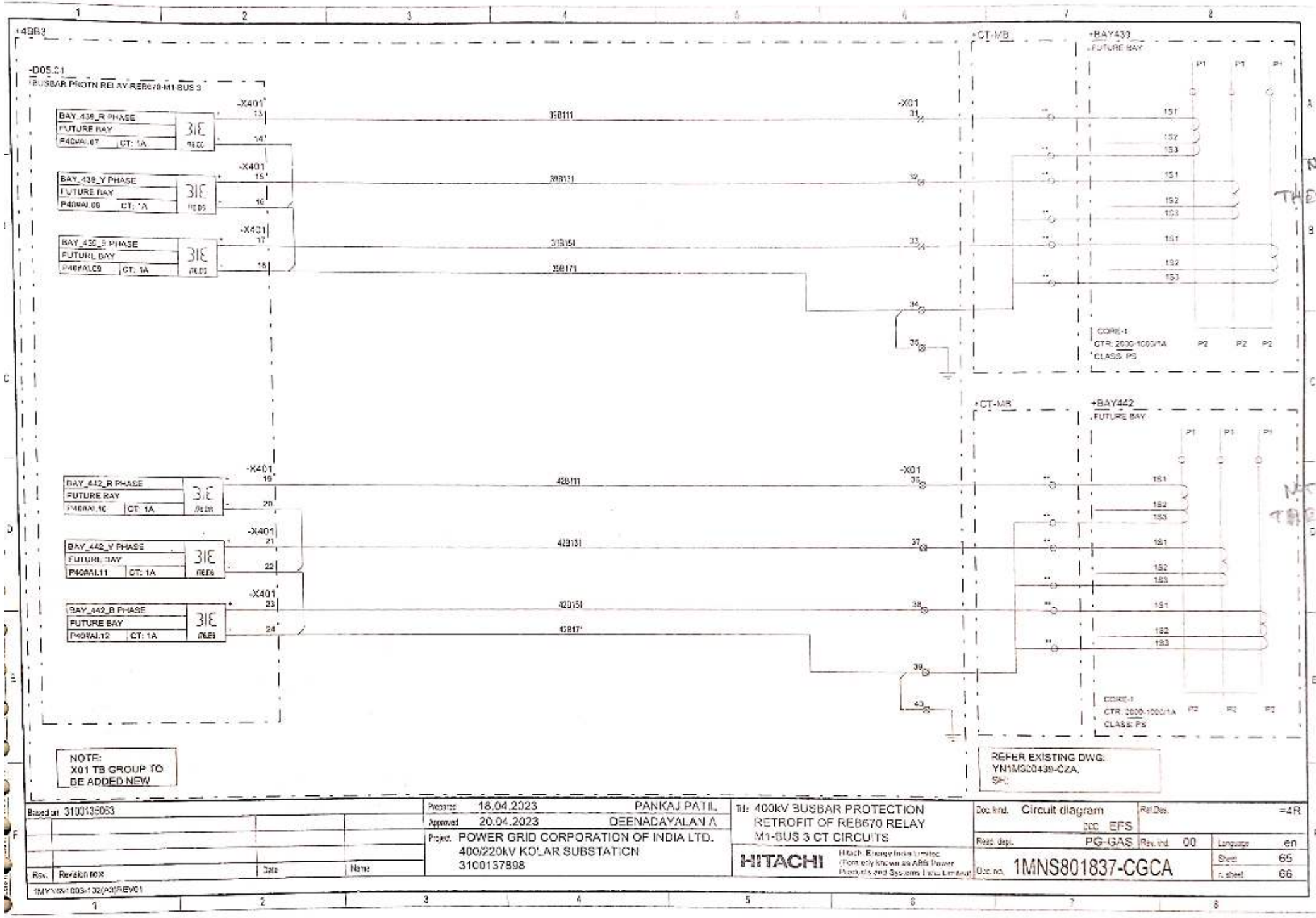


Scanned with OKEN Scanner



Based on 3100135063			Prepared 18.04.2023 PANKAJ PATIL	TIE 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 CT CIRCUITS	Doc.kind. Circuit diagram DOC EFS	Ref.Des.	=4R
			Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc.no. 1MNS801837-CGCA		Sheet 64 / n.sheet 65
Rev.	Revision note	Date	Name				

1MYN291009-102/A3/REV01



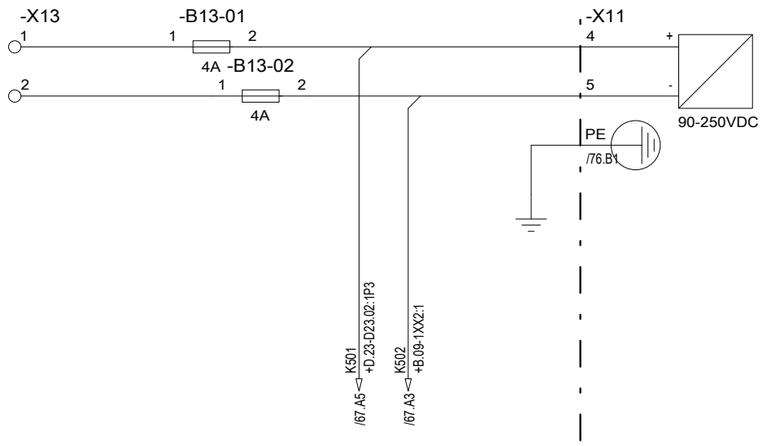
Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB3

FROM SH: 006/2

-X13 -B13-01 -B13-02



-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

PSM
-X11

K501 +D.23-D23.02:1P3 /67.A5

K502 +B.09-1XX2:1 /67.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
SFP

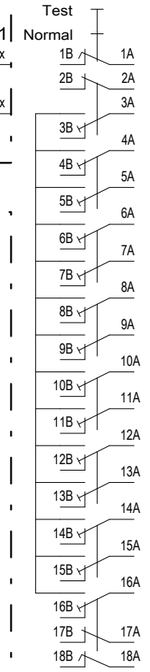
-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

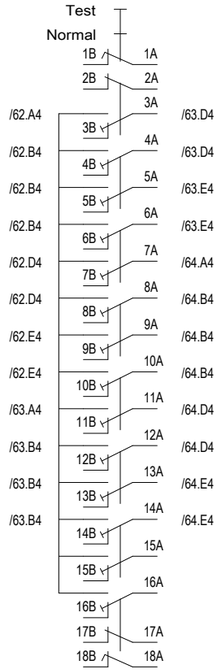
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

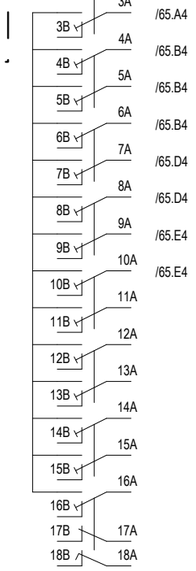
-D21.101.101



-D21.113.101



-D21.155.101



/62.A4 /62.B4 /62.B4 /62.B4 /62.D4 /62.D4 /62.E4 /62.E4 /63.A4 /63.B4 /63.B4 /63.B4

/63.D4 /63.D4 /63.E4 /63.E4 /64.A4 /64.B4 /64.B4 /64.B4 /64.D4 /64.D4 /64.E4 /64.E4

/65.A4 /65.B4 /65.B4 /65.B4 /65.D4 /65.D4 /65.E4 /65.E4

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 012

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 66
n. sheet 67

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

MAIN 1 BUS 3PROT IN		-X31	1	/77.A2
P3#BI.01	220-250VDC		2	
MAIN 1 BUS 3 PROT OUT		-X31	3	/77.B2
P3#BI.02	220-250VDC		4	
SPARE		-X31	5	/77.B2
P3#BI.03	220-250VDC		6	
TRIP RELAY RESET		-X31	7	/77.B2
96A BUS-3				
P3#BI.04	220-250VDC		8	
SPARE		-X31	9	/77.C2
P3#BI.05	220-250VDC		10	
SPARE		-X31	11	/77.C2
P3#BI.06	220-250VDC		12	
SPARE		-X31	13	/77.C2
P3#BI.07	220-250VDC		14	
REB670 RELAY FAULTY		-X31	15	/77.D2
BUS 3 - MAIN 2				
P3#BI.08	220-250VDC		16	

NOTE:
3X04 TB GROUP
TO BE ADDED NEW

+D.05-D05.01:5 (-X11) /66.B2 K502
+D.05-D05.01:4 (-X11) /66.B2 K501

K503 -1XX2 1
-D23.02 1P3 1P4 /67.A7 IN
BB-3 M1 IN/OUT SWITCH

K504
-D23.02 1P2 /67.A7 OUT 1P1
BB-3 M1 IN/OUT SWITCH

K505 -3X04 1
K501 /170.E4
K506 /170.D1
+D.13-D13.101.101:221
-3X04 2
K507 3
K508 4
K509 5
K510 -X14A 1, 2

-D23.02
1P2 /67.B4
1P1 C 1P3
1P4 /67.B3
A
2P2 2P1 C 2P3 2P4 A
3P2 3P1 C 3P3 3P4 A
4P2 4P1 C 4P3 4P4 A
IN A
OUT C
BB-3 M1 IN/OUT SWITCH

+4BB7
+D.05
-X14A 1 2
-X11 2 3 1
/148.B2
BUSBAR RELAY FAULTY
BUS-3 MAIN-2

+B.09-1XX2:2 K502 /68.A3
+B.33-X04:13 K501 /68.A5

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

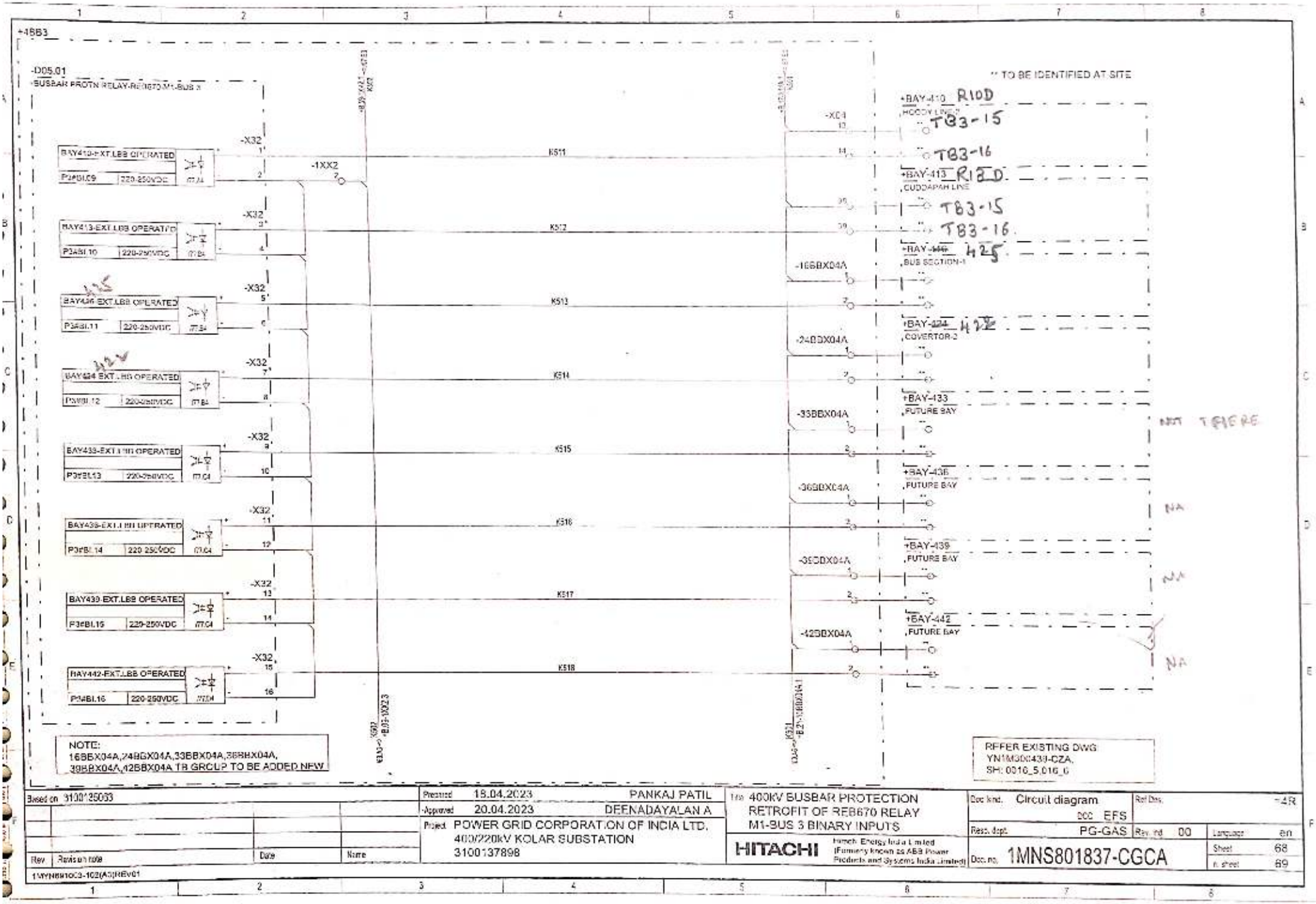
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 67
n. sheet 68

1MYN691003-102(A3)REV01

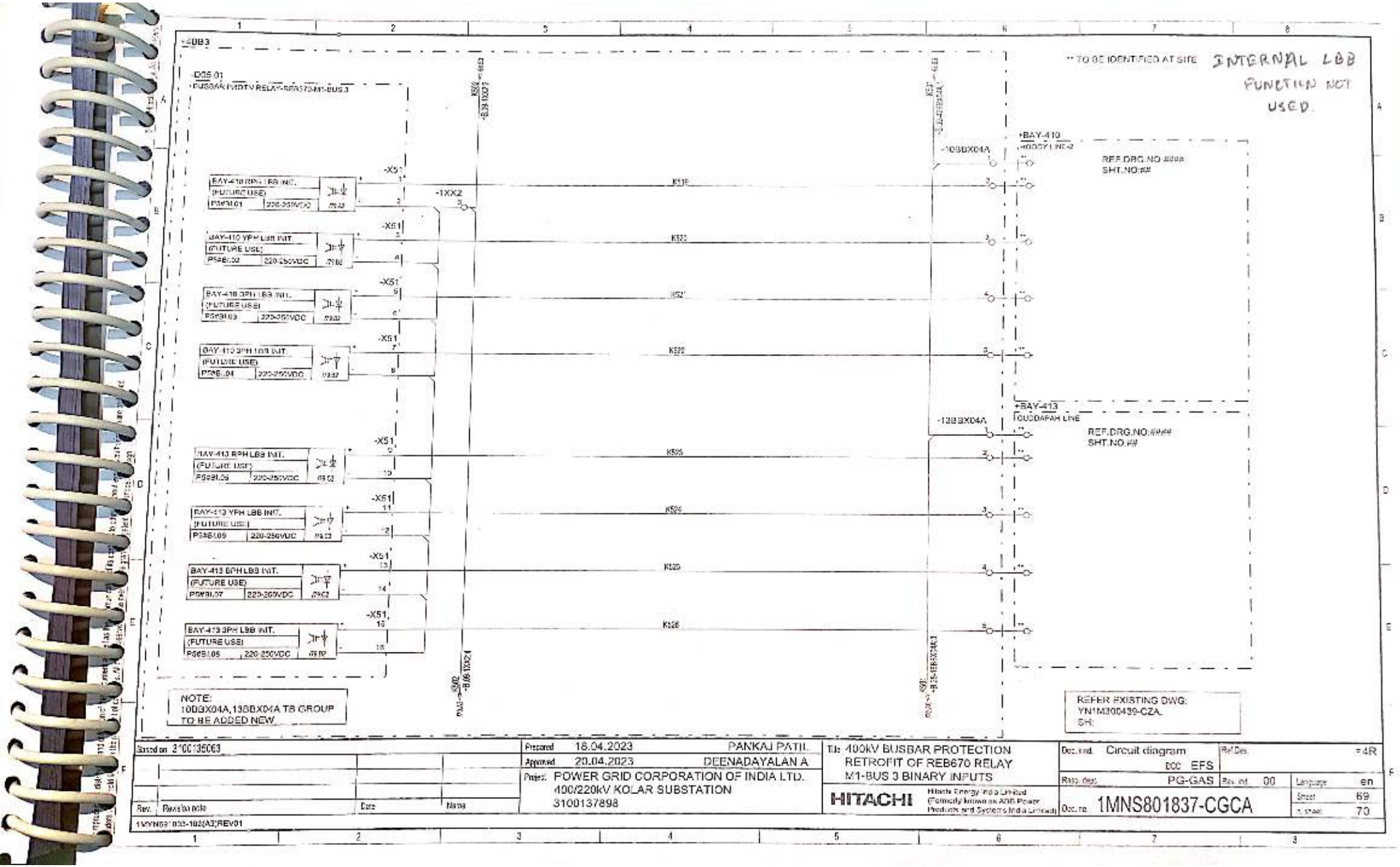
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



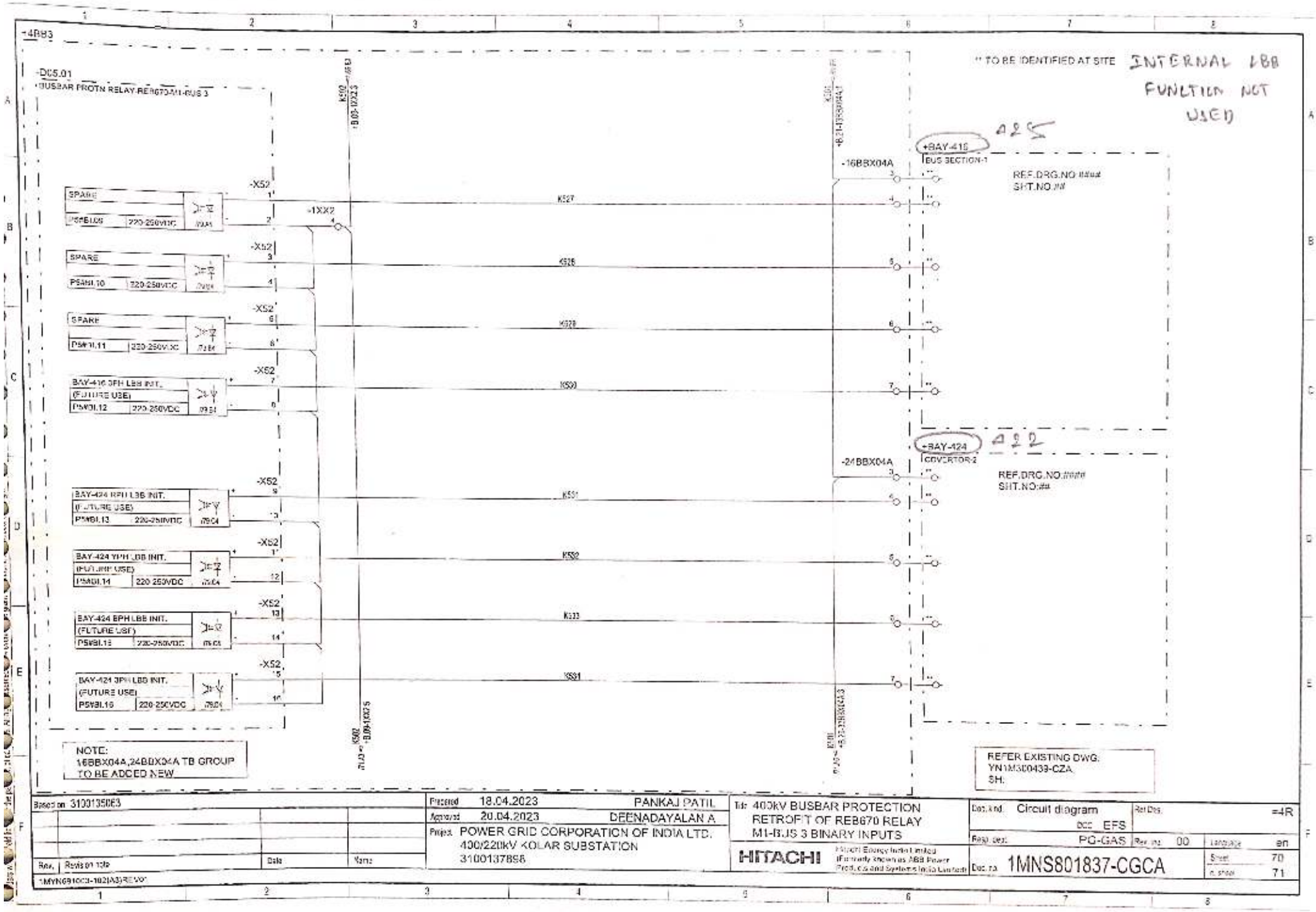
Based on 3100125033	Prepared 18.04.2023 PANKAJ PATIL	Title 400KV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS	Doc kind. Circuit diagram DOC EFS	Ref Des.	-4R
	Approved 20.04.2023 DEENADAYALAN A				
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00	Language en
			Doc. no. 1MNS801837-CGCA		Sheet 68
Rev Revision note / Date / Name					n. sheet 69

1MYN881003-102(A3)REV01

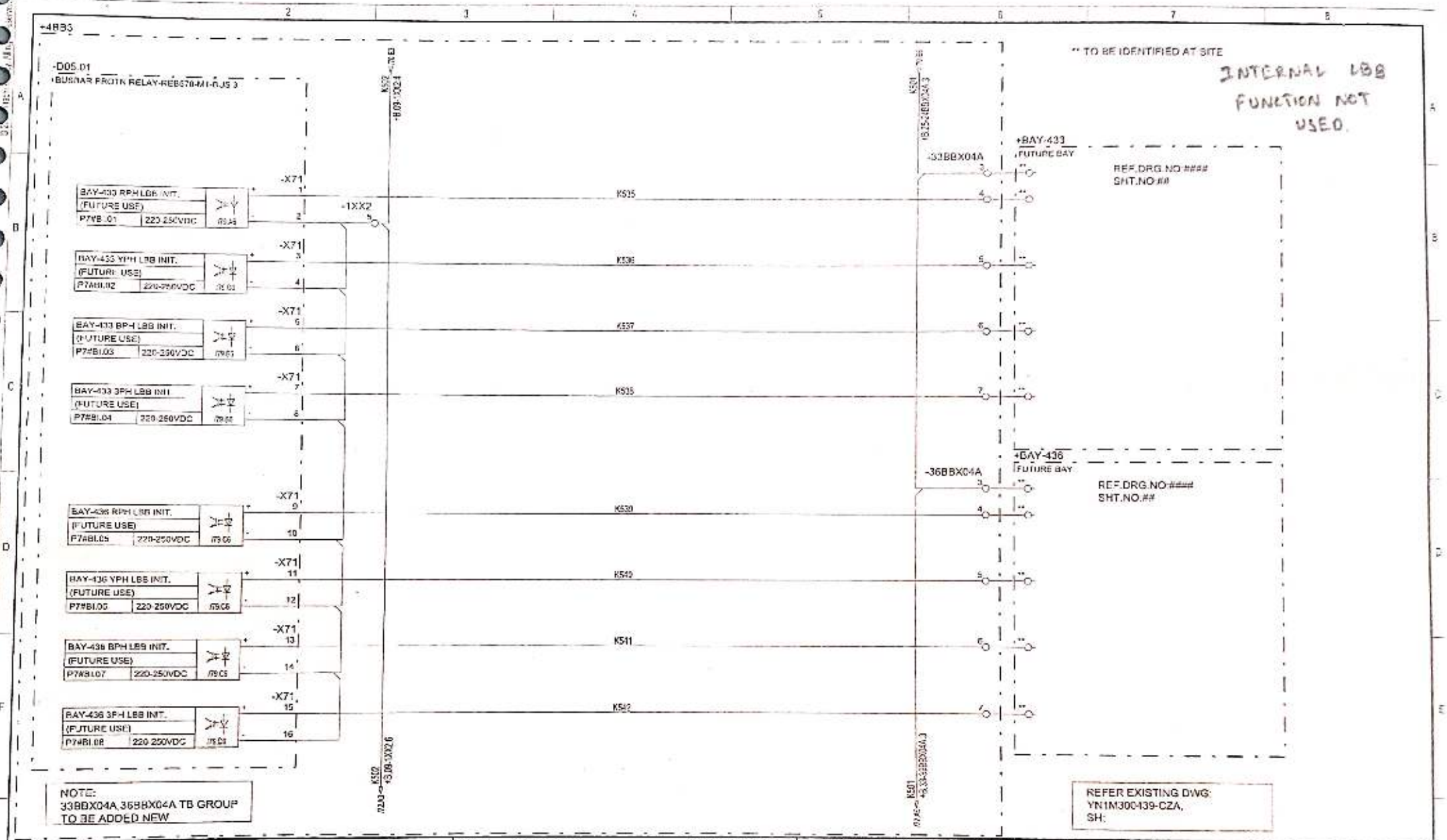
Scanned with OKEN Scanner



Scanned with OKEN Scanner

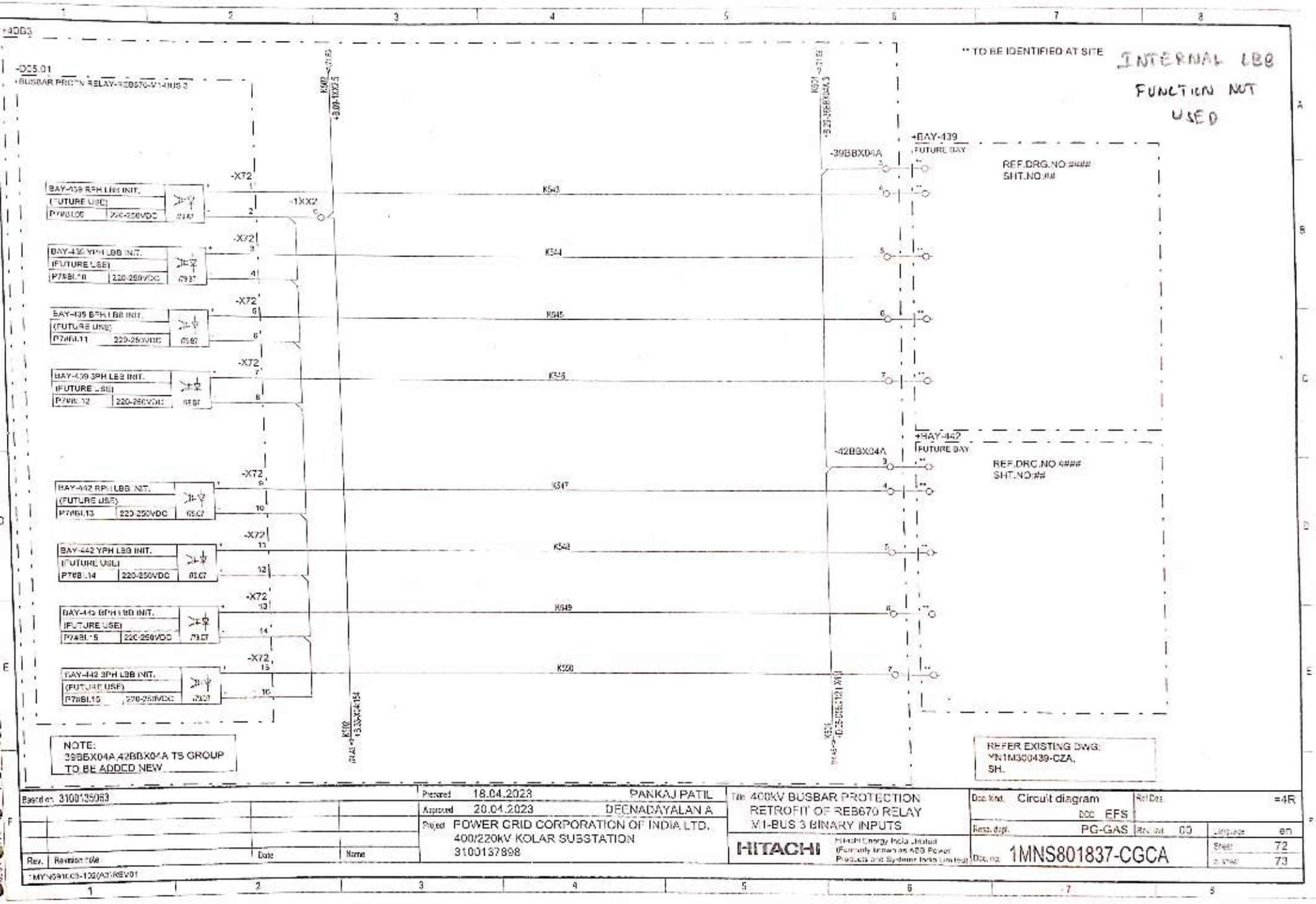


Scanned with OKEN Scanner



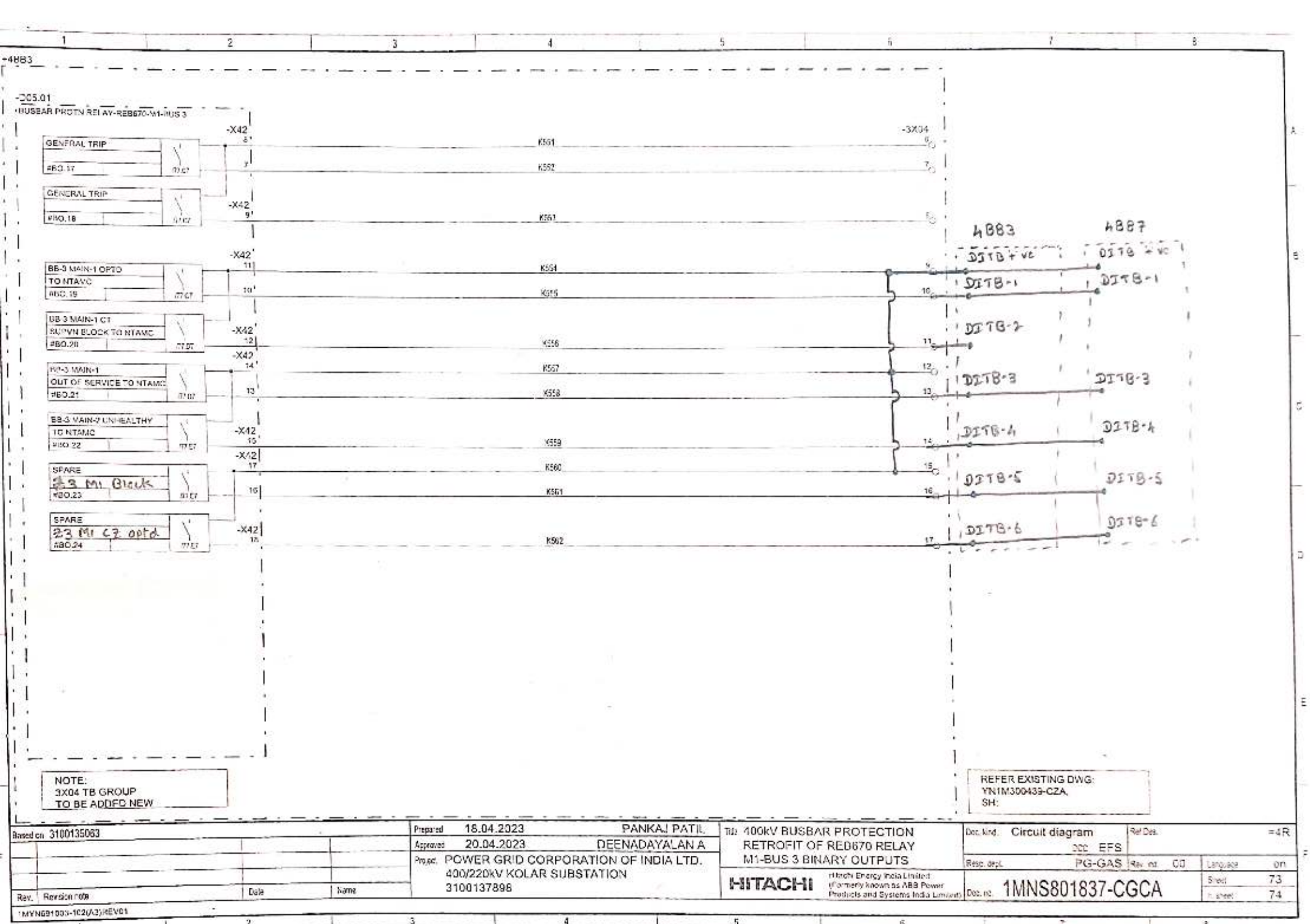
Based on 3100135063			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS	Doc. kind Circuit diagram	Ref.Des.	=4R
			Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev.	Revision note	Date	Name	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet 71
1MYN691003-102(A2)REV01							n. sheet 72

Scanned with OKEN Scanner



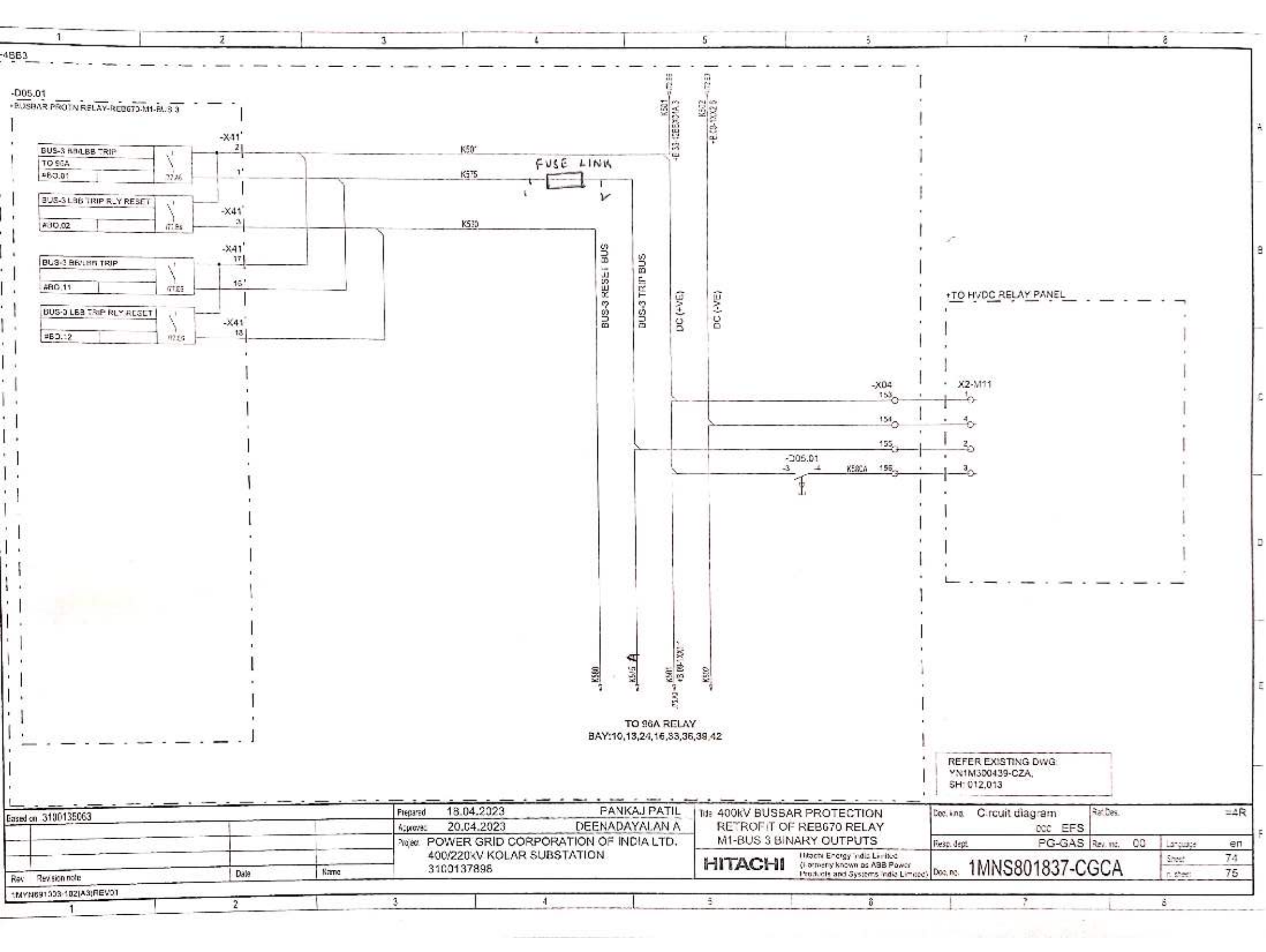
Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY INPUTS	Doc kind. Circuit diagram DOC EFS	Ref Doc.	=4R
	Approved 20.04.2023 DECNADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 72	of sheets 73
Rev. Revision note Date Name					
*MYN0910C3-132/A2/REV01					

Scanned with OKEN Scanner



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 BINARY OUTPUTS	Doc. kind Circuit diagram	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		acc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision 009 Date Name			Doc. no. 1MNS801837-CGCA	Sheet 73	
1MYN891000-102(A3)REV01				n. sheet 74	

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

K501 ◁/74.E5
+D.05-D05.01:-3

BAY-410 RPH LBB RETRIP-M1	#BO.03	/77.B6	-X41 5	-1XX1 1	4
BAY-410 YPH LBB RETRIP-M1	#BO.04	/77.C6	-X41 6		
BAY-410 BPH LBB RETRIP-M1	#BO.05	/77.C6	-X41 8		7
BAY-413 RPH LBB RETRIP-M1	#BO.06	/77.C6	-X41 9		
BAY-413 YPH LBB RETRIP-M1	#BO.07	/77.C6	-X41 11	-1XX1 2	10
BAY-413 BPH LBB RETRIP-M1	#BO.08	/77.D6	-X41 12		
BAY-424 RPH LBB RETRIP-M1	#BO.09	/77.D6	-X41 14		13
BAY-424 YPH LBB RETRIP-M1	#BO.10	/77.E6	-X41 15		
BAY-424 BPH LBB RETRIP-M1	#BO.01	/78.A2	-X61 2	-1XX1 3	1
BAY-416 LBB RETRIP-M1	#BO.02	/78.B2	-X61 3		
BAY-433 RPH LBB RETRIP-M1	#BO.03	/78.B2	-X61 5		4
BAY-433 YPH LBB RETRIP-M1	#BO.04	/78.B2	-X61 6		

-3X04: 3P13 18, 3P15 19, 3P17 20, 3P19 21, 3P21 22, 3P23 23, 3P25 24, 3P27 25, 3P29 26, 3P31 27, 3P33 28, 3P35 29

NOTE:
1XX1, 3X04 TB GROUP
TO BE ADDED NEW

K501 ◁/75.A6
+B.09-1XX1:4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

K501 ◁/75.E3
+B.09-1XX1:3

BAY-433 BPH LBB RETRIP-M1	#BO.05	/78.C2	-X61 8	-1XX1 4	7
BAY-436 RPH LBB RETRIP-M1	#BO.06	/78.C2	-X61 9		
BAY-436 YPH LBB RETRIP-M1	#BO.07	/78.C2	-X61 11		10
BAY-436 BPH LBB RETRIP-M1	#BO.08	/78.D2	-X61 12		
BAY-439 RPH LBB RETRIP-M1	#BO.09	/78.D2	-X61 14	-1XX1 5	13
BAY-439 YPH LBB RETRIP-M1	#BO.10	/78.D2	-X61 15		
BAY-439 BPH LBB RETRIP-M1	#BO.11	/78.E2	-X61 17		16
BAY-442 RPH LBB RETRIP-M1	#BO.12	/78.E2	-X61 18		
BAY-442 YPH LBB RETRIP-M1	#BO.13	/78.A4	-X62 2	-1XX1 6	1
BAY-442 BPH LBB RETRIP-M1	#BO.14	/78.B4	-X62 3		

-3X04: 3P37 30, 3P39 31, 3P41 32, 3P43 33, 3P45 34, 3P47 35, 3P49 36, 3P51 37, 3P53 38, 3P55 39

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title: 400kV BUSBAR PROTECTION
M1-BUS 3 BINARY OUTPUTS
M1-BUS 3 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	75
		n. sheet	76

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB3

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
PSM
90-250VDC

-X11

4 +
5 -
/66.B3
90-250VDC

PE

-X11

BUSBAR RELAY FAULTY	2	
BUS-3 MAIN-1	3	/139.E7
	1	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
TRM
1A, 50/60Hz

-X401

BAY_410_R PHASE	+	1		
HOODY LINE-2				
P40#AI.01 CT: 1A	-	2		/62.A2
BAY_410_Y PHASE	+	3		
HOODY LINE-2				
P40#AI.02 CT: 1A	-	4		/62.B2
BAY_410_B PHASE	+	5		
HOODY LINE-2				
P40#AI.03 CT: 1A	-	6		/62.B2
BAY_413_R PHASE	+	7		
CUDDAPAH LINE				
P40#AI.04 CT: 1A	-	8		/62.D2
BAY_413_Y PHASE	+	9		
CUDDAPAH LINE				
P40#AI.05 CT: 1A	-	10		/62.D2
BAY_413_B PHASE	+	11		
CUDDAPAH LINE				
P40#AI.06 CT: 1A	-	12		/62.E2
BAY_416_R PHASE	+	13		
BUS SECTION				
P40#AI.07 CT: 1A	-	14		/63.A2
BAY_416_Y PHASE	+	15		
BUS SECTION				
P40#AI.08 CT: 1A	-	16		/63.B2
BAY_416_B PHASE	+	17		
BUS SECTION				
P40#AI.09 CT: 1A	-	18		/63.B2
BAY_424_R PHASE	+	19		
CONVERTER-2				
P40#AI.10 CT: 1A	-	20		/63.D2
BAY_424_Y PHASE	+	21		
CONVERTER-2				
P40#AI.11 CT: 1A	-	22		/63.D2
BAY_424_B PHASE	+	23		
CONVERTER-2				
P40#AI.12 CT: 1A	-	24		/63.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
TRM
1A, 50/60Hz

-X401

BAY_433_R PHASE	+	1		
FUTURE BAY				
P40#AI.01 CT: 1A	-	2		/64.A2
BAY_433_Y PHASE	+	3		
FUTURE BAY				
P40#AI.02 CT: 1A	-	4		/64.B2
BAY_433_B PHASE	+	5		
FUTURE BAY				
P40#AI.03 CT: 1A	-	6		/64.B2
BAY_436_R PHASE	+	7		
FUTURE BAY				
P40#AI.04 CT: 1A	-	8		/64.D2
BAY_436_Y PHASE	+	9		
FUTURE BAY				
P40#AI.05 CT: 1A	-	10		/64.D2
BAY_436_B PHASE	+	11		
FUTURE BAY				
P40#AI.06 CT: 1A	-	12		/64.E2
BAY_439_R PHASE	+	13		
FUTURE BAY				
P40#AI.07 CT: 1A	-	14		/65.A2
BAY_439_Y PHASE	+	15		
FUTURE BAY				
P40#AI.08 CT: 1A	-	16		/65.B2
BAY_439_B PHASE	+	17		
FUTURE BAY				
P40#AI.09 CT: 1A	-	18		/65.B2
BAY_442_R PHASE	+	19		
FUTURE BAY				
P40#AI.10 CT: 1A	-	20		/65.D2
BAY_442_Y PHASE	+	21		
FUTURE BAY				
P40#AI.11 CT: 1A	-	22		/65.D2
BAY_442_B PHASE	+	23		
FUTURE BAY				
P40#AI.12 CT: 1A	-	24		/65.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 76
n. sheet 77

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

Scanned with OKEN Scanner

+4BG3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X31

MAIN 1 BUS 3 PROT IN	P3#BI.01	220-250VDC
MAIN 1 BUS 3 PROT OUT	P3#BI.02	220-250VDC
SPARE	P3#BI.03	220-250VDC
TRIP RELAY RESET 86A BUS-3	P3#BI.04	220-250VDC
SPARE	P3#BI.05	220-250VDC
SPARE	P3#BI.06	220-250VDC
SPARE	P3#BI.07	220-250VDC
REB670 RELAY FAULTY BUS 3 - MAIN 2	P3#BI.08	220-250VDC

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X32

BAY410-EXT.LBB OPERATED	P3#BI.09	220-250VDC
BAY413-EXT.LBB OPERATED	P3#BI.10	220-250VDC
BAY418-EXT.LBB OPERATED	P3#BI.11	220-250VDC
BAY424 EXT.LBB OPERATED	P3#BI.12	220-250VDC
BAY433-EXT.LBB OPERATED	P3#BI.13	220-250VDC
BAY436-EXT.LBB OPERATED	P3#BI.14	220-250VDC
BAY439-EXT.LBB OPERATED	P3#BI.15	220-250VDC
BAY442-EXT.LBB OPERATED	P3#BI.16	220-250VDC

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X41

BUS-3 BBLBB TRIP TO 86A	#BO.01
BUS-3 LBB TRIP RLY RESET	#BO.02
BAY-410 RPH LBB RETRIP-M1	#BO.03
BAY-410 YPH LBB RETRIP-M1	#BO.04
BAY-410 BPH LBB RETRIP-M1	#BO.05
BAY-413 RPH LBB RETRIP-M1	#BO.06
BAY-413 YPH LBB RETRIP-M1	#BO.07
BAY-413 BPH LBB RETRIP-M1	#BO.08
BAY-424 RPH LBB RETRIP-M1	#BO.09
BAY-424 YPH LBB RETRIP-M1	#BO.10
BUS-3 DBLBB TRIP	#BO.11
BUS-3 LBB TRIP RLY RESET	#BO.12

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X42

BUSBAR-3 OPTD ANNUNCIATION CKT	#BO.13
BB-3 CT SUPVN ANNUNCIATION CKT	#BO.14
BUSBAR-3 OPTD EVENT LOGGER CKT	#BO.15
BB-3 CT SUPVN EVENT LOGGER CKT	#BO.16
GENERAL TRIP	#BO.17
GENERAL TRIP	#BO.18
BB-3 MAIN-1 OPTD TO NTAMC	#BO.19
BB-3 MAIN-1 CT SUPVN BLOCK TO NTAMC	#BO.20
BB-3 MAIN-1 OUT OF SERVICE TO NTAMC	#BO.21
BB-3 MAIN-2 UNHEALTHY TO NTAMC	#BO.22
SPARE Z3 M1 Block	#BO.23
SPARE Z3 M1 C2 optd.	#BO.24

Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW	Doc. kind Circuit diagram; Ref Des. =4R
	Approved 20.04.2023 DEENADAYALAN A		DCC EFS
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS; Rev. ind. 00; Language en
Rev. Revision note / Date / Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA; Sheet 77; n. Sheet 78

1MYNS991003-102(AS)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X61

BAY-424 BPH LBB RETRIP-M1	#BO.01	2 / 1	/75.D2
BAY-416 LBB RETRIP-M1	#BO.02	3	/75.E2
BAY-433 RPH LBB RETRIP-M1	#BO.03	5 / 4	/75.E2
BAY-433 YPH LBB RETRIP-M1	#BO.04	6	/75.E2
BAY-433 BPH LBB RETRIP-M1	#BO.05	8 / 7	/75.B5
BAY-436 RPH LBB RETRIP-M1	#BO.06	9	/75.B5
BAY-436 YPH LBB RETRIP-M1	#BO.07	11 / 10	/75.B5
BAY-436 BPH LBB RETRIP-M1	#BO.08	12	/75.C5
BAY-439 RPH LBB RETRIP-M1	#BO.09	14 / 13	/75.C5
BAY-439 YPH LBB RETRIP-M1	#BO.10	15	/75.C5
BAY-439 BPH LBB RETRIP-M1	#BO.11	17 / 16	/75.D5
BAY-442 RPH LBB RETRIP-M1	#BO.12	18	/75.D5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3
BOM

-X62

BAY-442 YPH LBB RETRIP-M1	#BO.13	2 / 1	/75.D5
BAY-442 BPH LBB RETRIP-M1	#BO.14	3	/75.E5
BUSBAR-3 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/174.E2
BB-3 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/174.E2
SPARE	#BO.17	8 / 7	
SPARE	#BO.18	9	
SPARE	#BO.19	11 / 10	
SPARE	#BO.20	12	
SPARE	#BO.21	14 / 13	
SPARE	#BO.22	15	
SPARE	#BO.23	17 / 16	
SPARE	#BO.24	18	

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 78
n. sheet 79

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB3

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X51

BAY-410 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	/69.B2
BAY-410 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	/69.B2
BAY-410 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	/69.C2
BAY-410 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	/69.C2
BAY-413 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	/69.D2
BAY-413 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	/69.D2
BAY-413 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	/69.E2
BAY-413 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	/69.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X52

SPARE		P5#BI.09	220-250VDC	/70.B2
SPARE		P5#BI.10	220-250VDC	/70.B2
SPARE		P5#BI.11	220-250VDC	/70.C2
BAY-416 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	/70.C2
BAY-424 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	/70.D2
BAY-424 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	/70.D2
BAY-424 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	/70.E2
BAY-424 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	/70.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X71

BAY-433 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	/71.B2
BAY-433 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	/71.B2
BAY-433 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	/71.C2
BAY-433 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	/71.C2
BAY-436 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	/71.D2
BAY-436 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	/71.D2
BAY-436 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	/71.E2
BAY-436 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	/71.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 3
BIM
220-250VDC

-X72

BAY-439 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	/72.B2
BAY-439 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	/72.B2
BAY-439 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	/72.C2
BAY-439 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	/72.C2
BAY-442 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	/72.D2
BAY-442 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	/72.D2
BAY-442 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	/72.E2
BAY-442 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	/72.E2

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

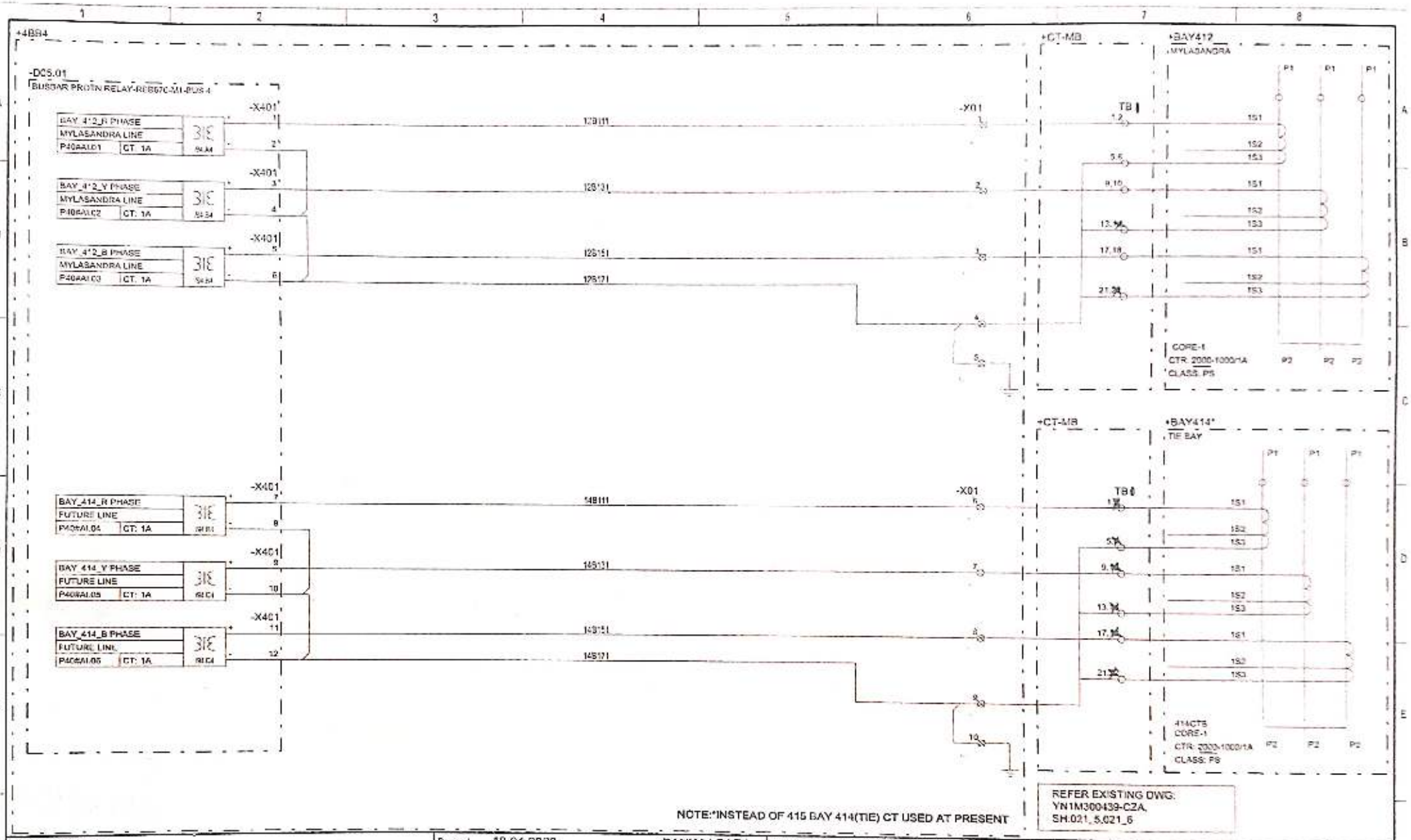
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 79
n. sheet 80

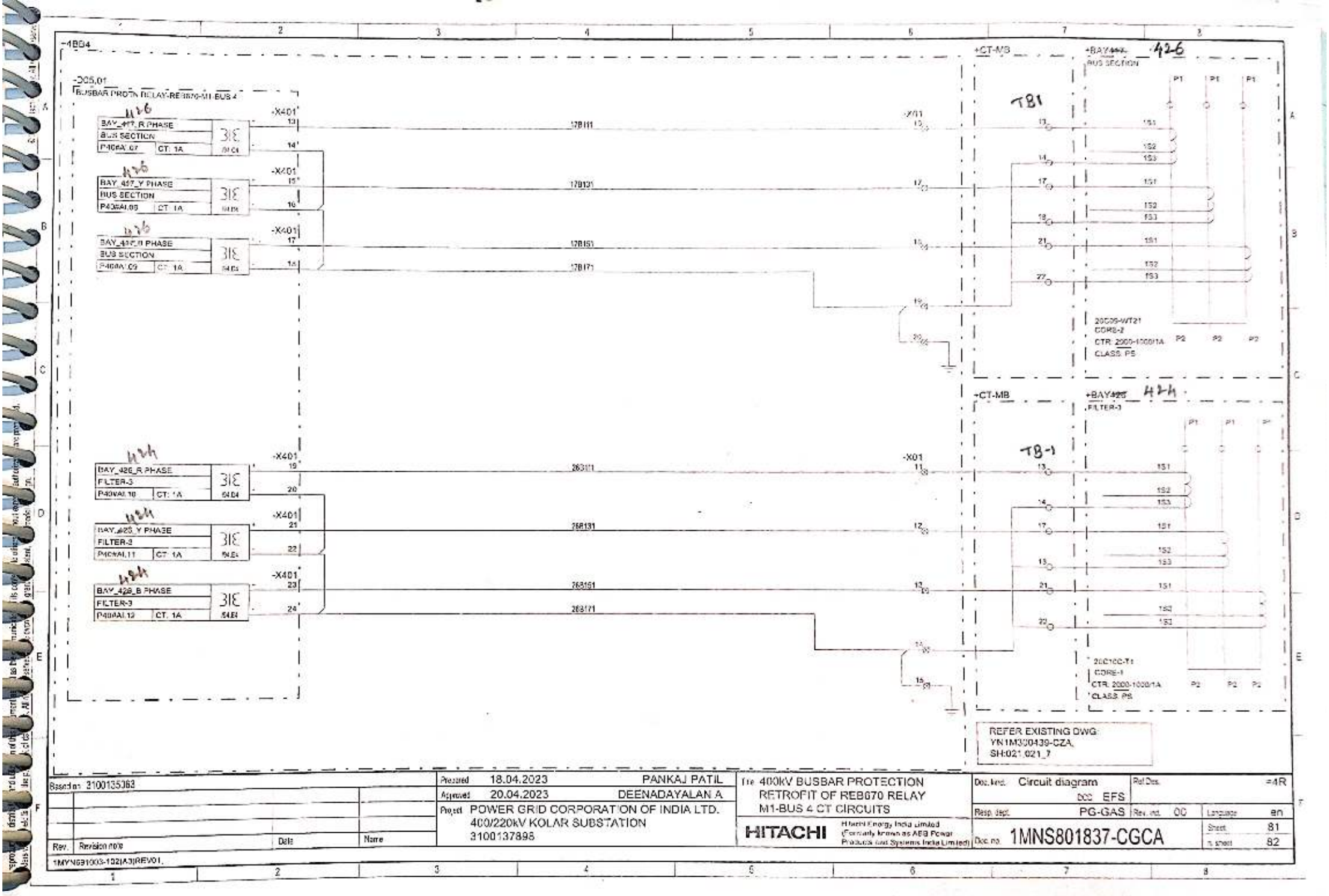
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

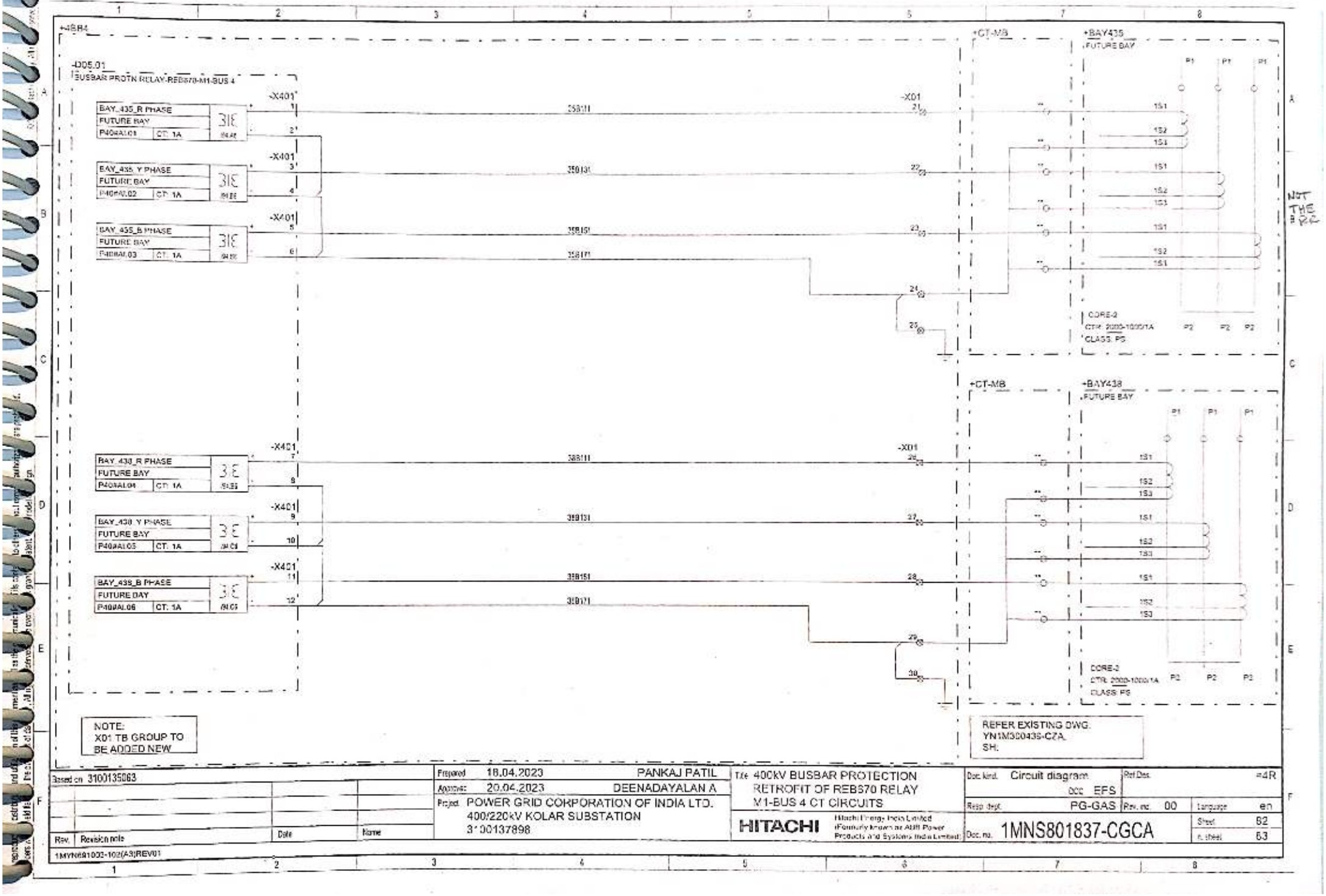


Based on 3100135003			Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 CT CIRCUITS	Doc. kind Circuit diagram	Ref.Des.	=4R
			Approved 20.04.2023 DEENADAYALAN A		DCC EFS		
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev.	Revision note	Date	Name		Doc. no. 1MNS801837-CGCA	Sheet 80	
1MYN691013-102(A3)REV01						n. sheet 81	

Scanned with OKEN Scanner



Scanned with OKEN Scanner



NOT THE P&C

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

BAY_441_R PHASE			-X401 + 13 / - 14
FUTURE BAY			
P40#AI.07	CT: 1A	/94.C6	
BAY_441_Y PHASE			-X401 + 15 / - 16
FUTURE BAY			
P40#AI.08	CT: 1A	/94.D6	
BAY_441_B PHASE			-X401 + 17 / - 18
FUTURE BAY			
P40#AI.09	CT: 1A	/94.D6	

BAY_444_R PHASE			-X401 + 19 / - 20
FUTURE BAY			
P40#AI.10	CT: 1A	/94.D6	
BAY_444_Y PHASE			-X401 + 21 / - 22
FUTURE BAY			
P40#AI.11	CT: 1A	/94.E6	
BAY_444_B PHASE			-X401 + 23 / - 24
FUTURE BAY			
P40#AI.12	CT: 1A	/94.E6	

-D21.125.101

41B112	3A	/84.D8	3B
41B111	7A	/84.D8	7B
41B132	4A	/84.D8	4B
41B131	8A	/84.D8	8B
41B152	5A	/84.D8	5B
41B151	9A	/84.E8	9B
41B172	6A	/84.D8	6B
41B171	10A	/84.E8	10B

** -X01

31	**
32	**
33	**
34	
35	
36	**
37	**
38	**
39	
40	

+CT-MB

+BAY441
FUTURE BAY

**	1S1	P1 P1 P1
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	

CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

+CT-MB

+BAY444
FUTURE BAY

**	1S1	P1 P1 P1
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	
**	1S1	
**	1S2	
	1S3	

CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 83
n. sheet 84

1MYN691003-102(A3)REV01

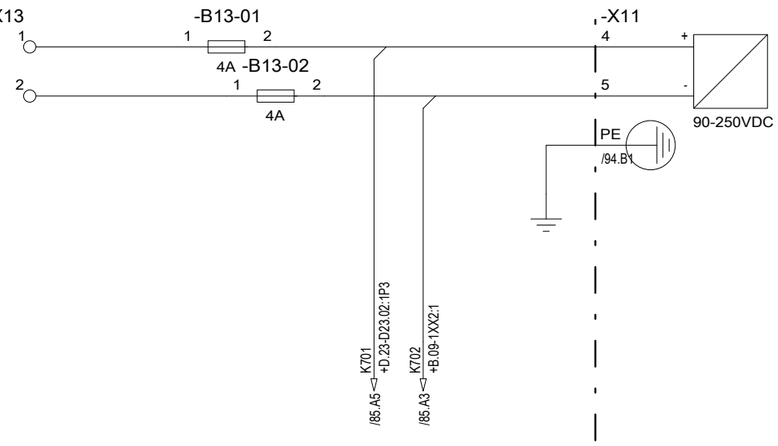
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

FROM SH: 006/2

-X13 -B13-01 -B13-02



-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96A OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
SFP

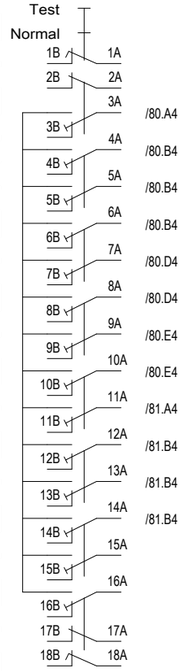
-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

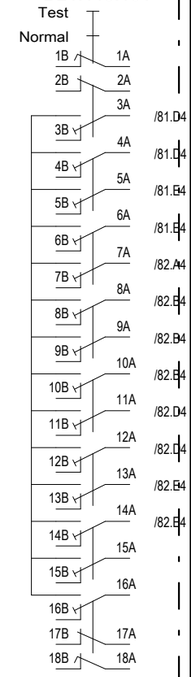
+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

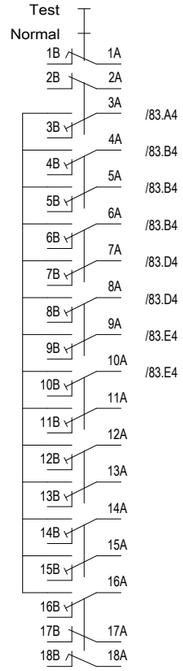
-D21.101.101



-D21.113.101



-D21.125.101



REFER EXISTING DWG:
YN1M300439-CZA,
SH: 023

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL

Approved 20.04.2023 DEENADAYALAN A

Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS

Ref.Des. =4R

Resp. dept. PG-GAS

Rev. ind. 01

Language en

Doc. no. 1MNS801837-CGCA

Sheet 84

n. sheet 85

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

-X31	1	+	MAIN 1 BUS 4 PROT IN	
	2	-	P3#BI.01	220-250VDC /95.A2
-X31	3	+	MAIN 1 BUS 4 PROT OUT	
	4	-	P3#BI.02	220-250VDC /95.B2
-X31	5	+	SPARE	
	6	-	P3#BI.03	220-250VDC /95.B2
-X31	7	+	TRIP RELAY OPTD 96A BUS-4	
	8	-	P3#BI.04	220-250VDC /95.B2
-X31	9	+	SPARE	
	10	-	P3#BI.05	220-250VDC /95.C2
-X31	11	+	SPARE	
	12	-	P3#BI.06	220-250VDC /95.C2
-X31	13	+	SPARE	
	14	-	P3#BI.07	220-250VDC /95.C2
-X31	15	+	REB670 RELAY FAULTY BUS 4 - MAIN 2	
	16	-	P3#BI.08	220-250VDC /95.D2

-1XX2 1

+D.05-D05.01:5 (-X11) /84.B2 K702

+D.05-D05.01:4 (-X11) /84.B2 K701

K703 -D23.02 1P3 1P4 /85.B8 IN
BB-4 M1 IN/OUT SWITCH

K704 -D23.02 1P2 /85.A8 OUT 1P1
BB-4 M1 IN/OUT SWITCH

K705 -4X04 1

K706 K701 /170.E8 +D.17-D17.101.149:222
K706 /170.D5 +D.13-D13.101.101:221

-4X04 2

K707 3

K708 4

K709 5

K710 -X14A 1 -X14A 2

-D23.02
1P2 /85.B4 C 1P1
1P4 /85.B3 A 1P3
2P2 C 2P1
2P4 A 2P3
3P2 C 3P1
3P4 A 3P3
4P2 C 4P1
4P4 A 4P3
IN A
OUT C
BB-4 M1 IN/OUT SWITCH

+4BB8
+D.05
-X14A 1 2
-X11 2 3 1
/166.B2
BUSBAR RELAY FAULTY
BUS-4 MAIN-2

NOTE:
7X04 TB GROUP
TO BE ADDED NEW

+B.09-1XX2:2 /86.A3 K702

+B.33-X04:13 /86.A5 K701

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

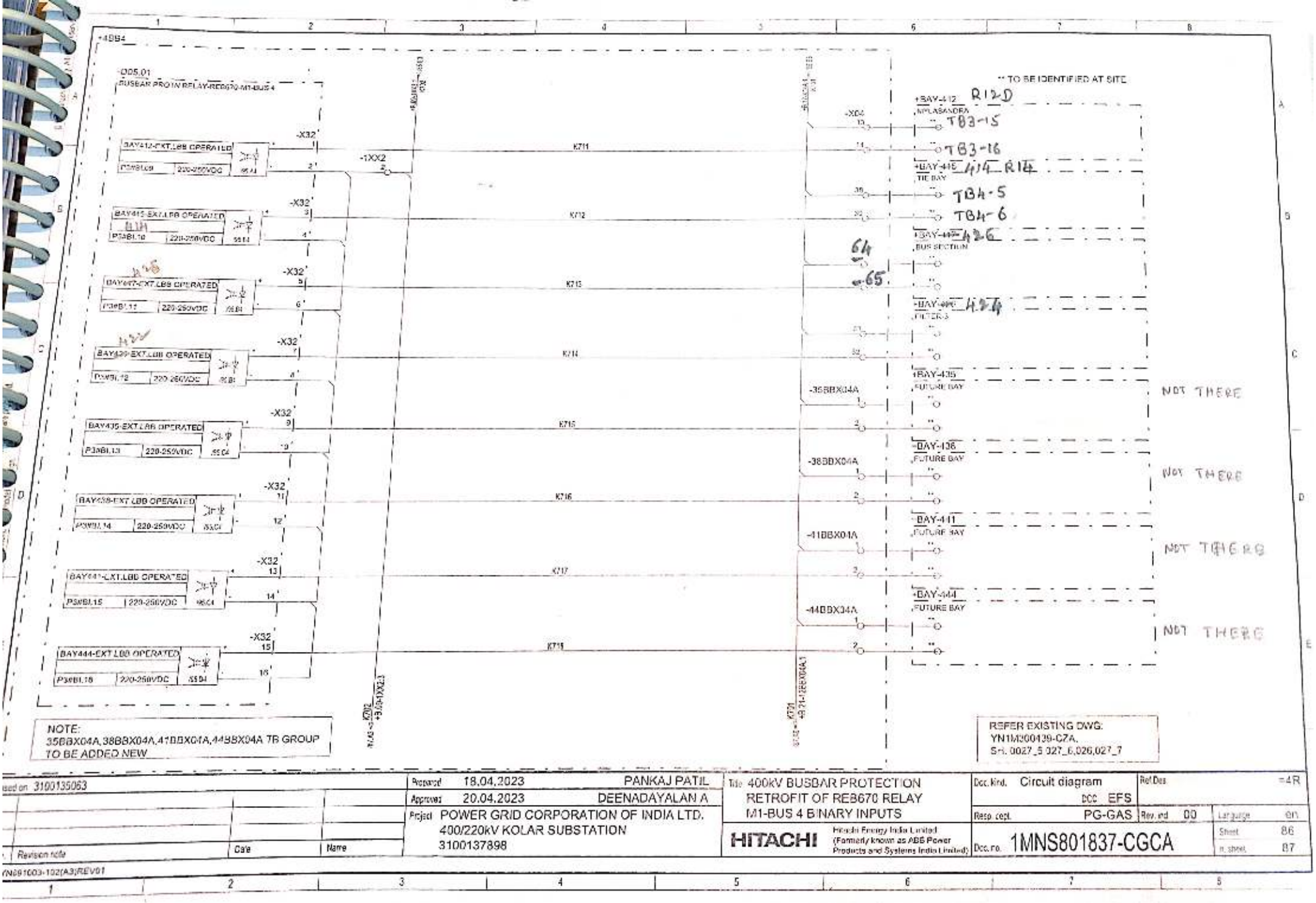
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 85
n. sheet 86

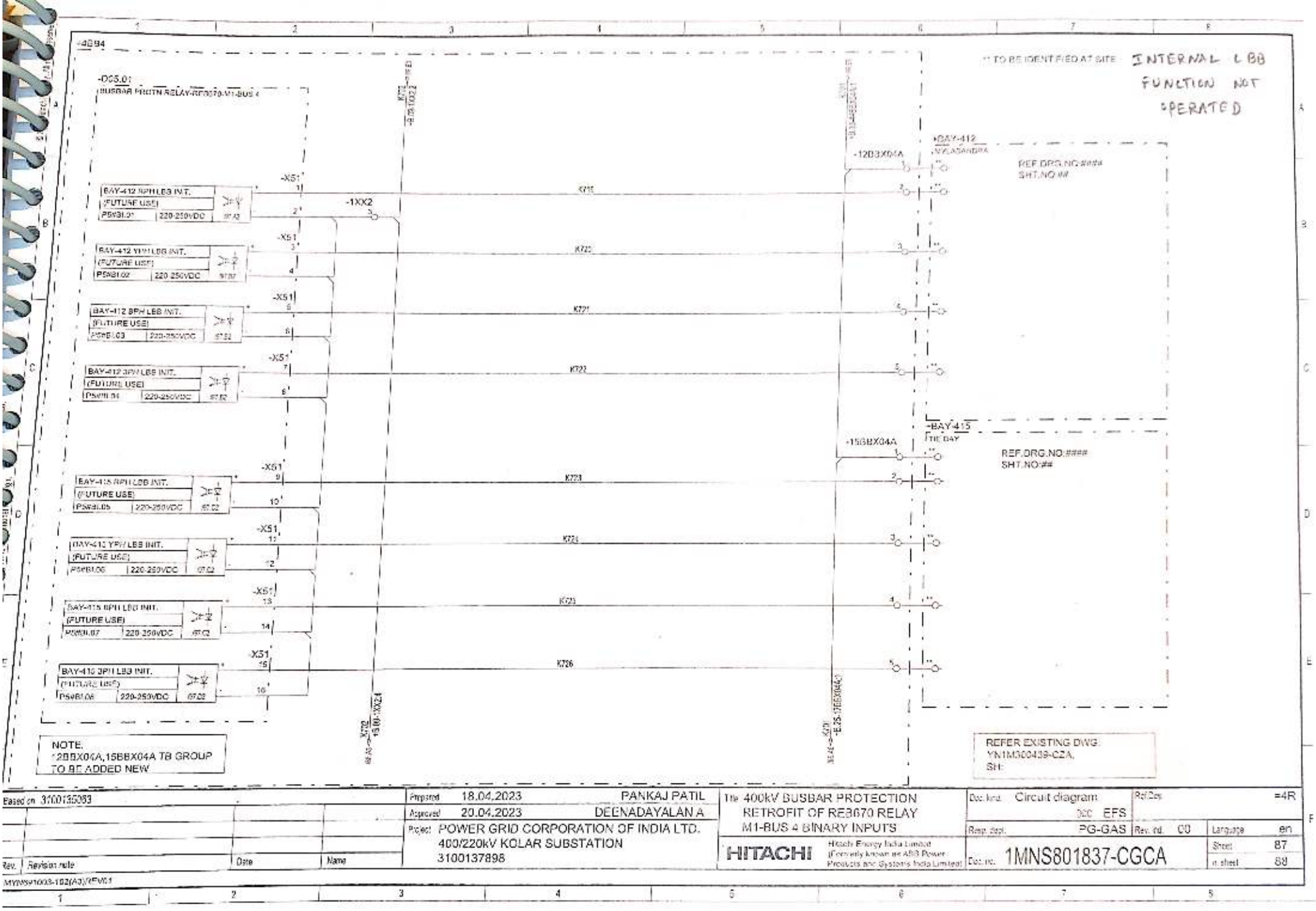
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

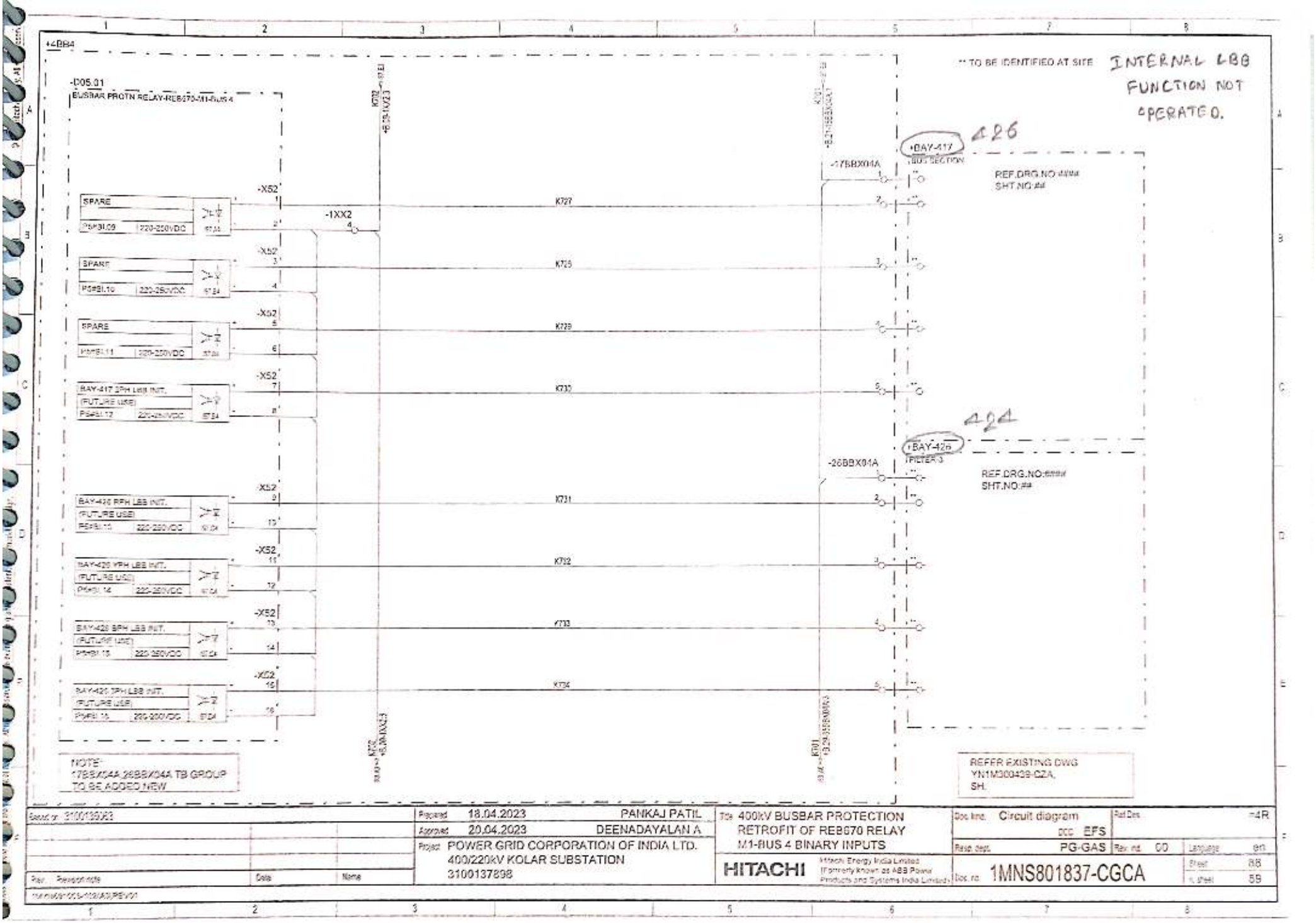


Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY INPUTS	Doc.kind. Circuit diagram DCC EFS	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A				
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp.dept. PG-GAS	Rev.ind. 00	Language en
Revision note / Date / Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc.no. 1MNS801837-CGCA	Sheet 86	n.sheet 87

Scanned with OKEN Scanner

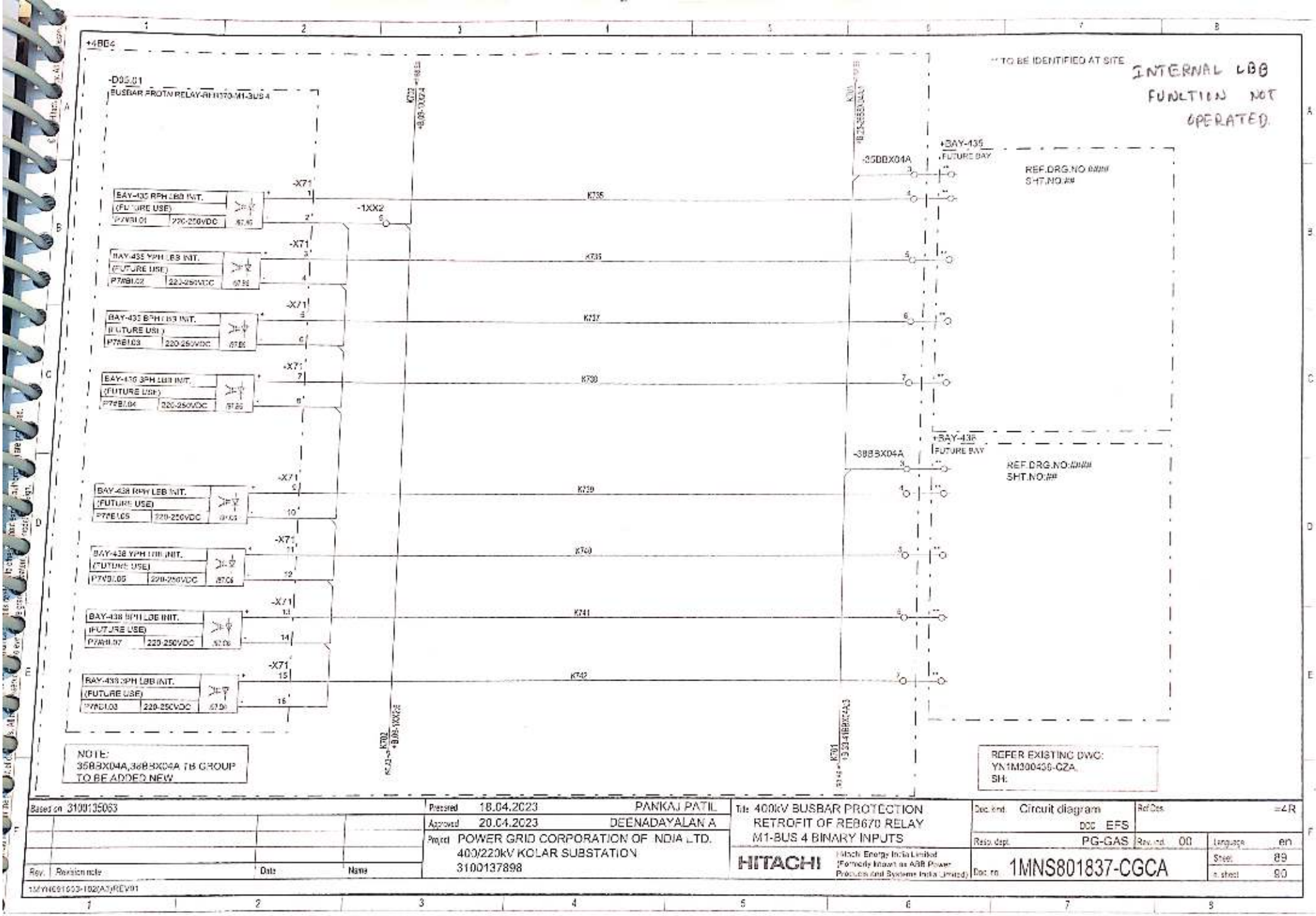


Scanned with OKEN Scanner

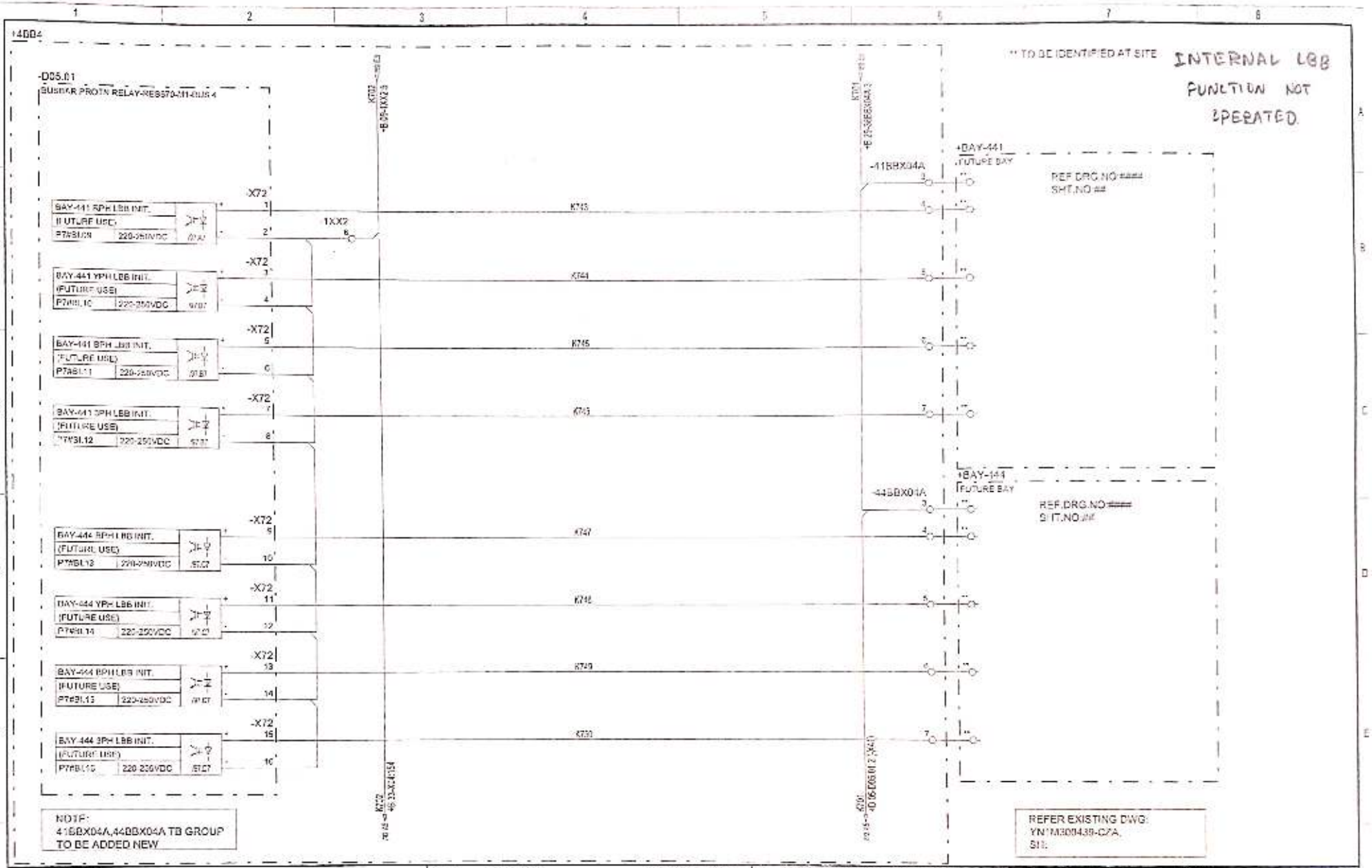


Execut. gr. 3100139023	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY INPUTS	Doc kind. Circuit diagram DCC EFS	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev. ind. 00	Language en
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet	88
				No. sheet	59
Rev. Revision note	Date Name				

Scanned with OKEN Scanner

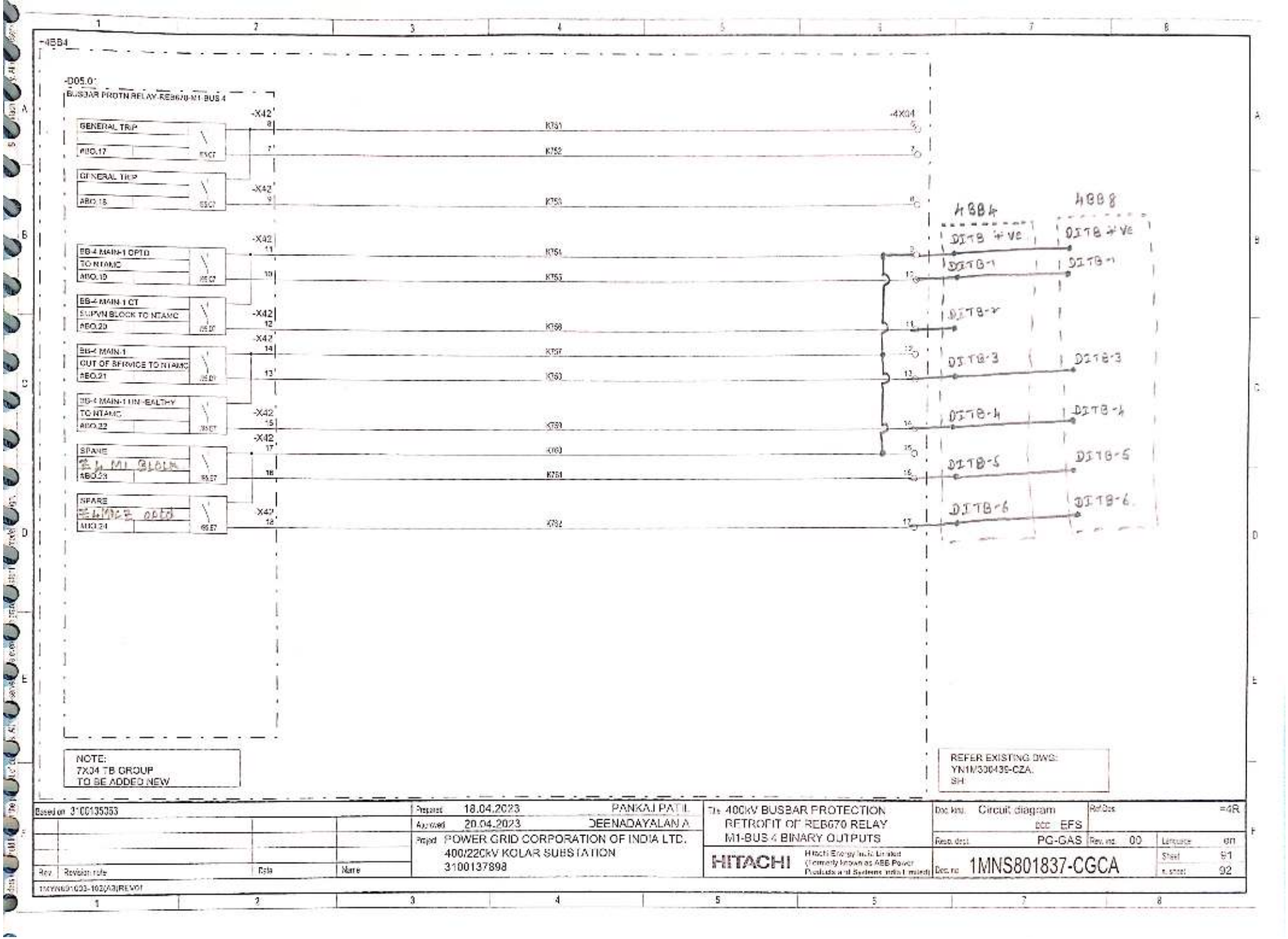


Scanned with OKEN Scanner



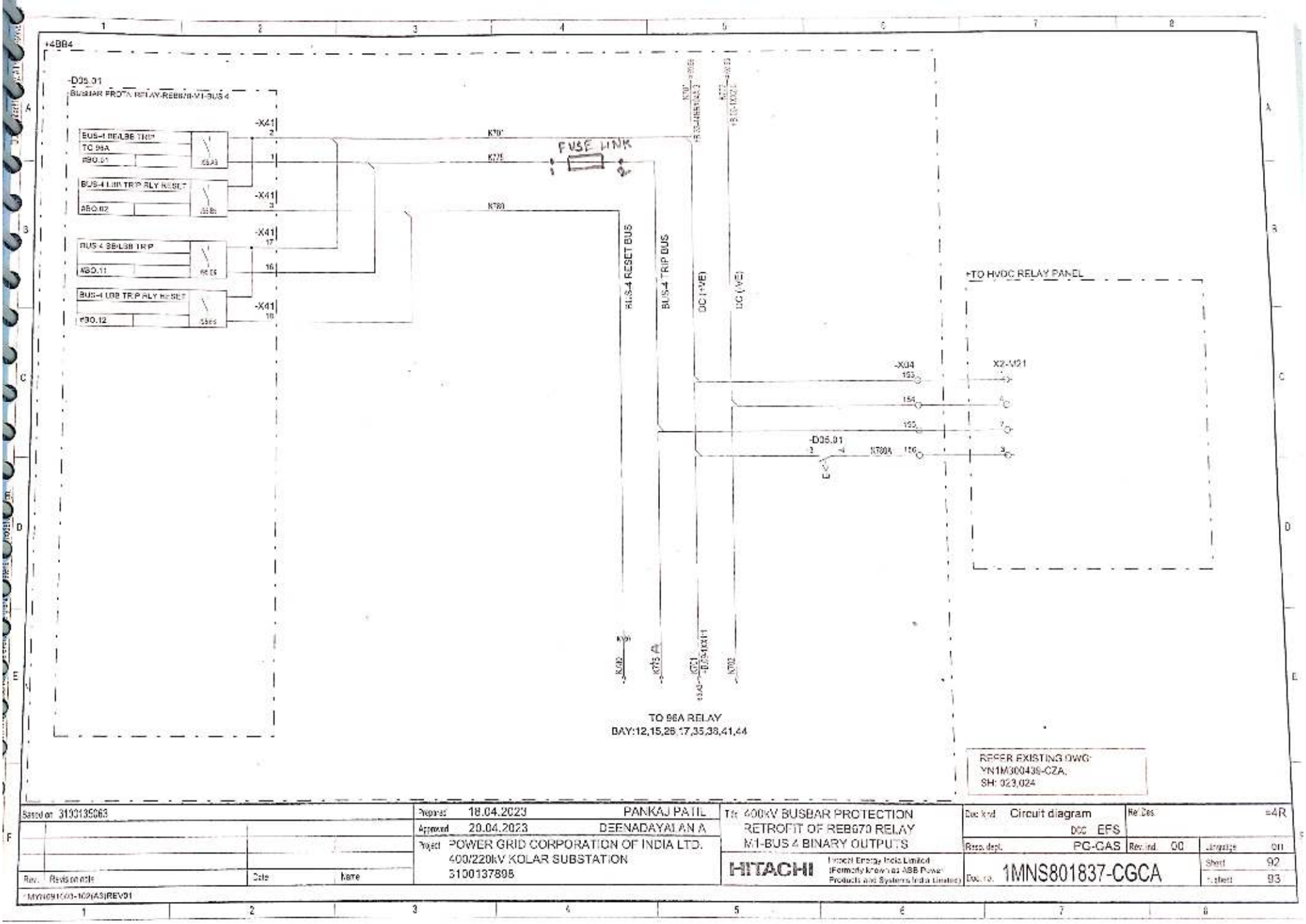
Based on 3100135093	Prepared 18.04.2023 PANKAJ PATIL	Info 400kV BUSBAR PROTECTION RETROFIT OF RED670 RELAY M1-BUS 4 BINARY INPUTS	Doc. kind Circuit diagram	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		doc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137896		Resp. dept. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 90	
1MYNGR1003-1(A)REV01				n.sheet 91	

Scanned with OKEN Scanner



Based on 3100135053	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY OUTPUTS	Doc kind Circuit diagram; ecc EFS; Ref Des =4R
Rev. Revision note / Date / Name	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev. ind. 00; Language en
1MYN801033-102(A3)REV01	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)	Doc no 1MNS801837-CGCA; Sheet 91; n. sheet 92

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

K701 /92.E5
+D.05-D05.01:-3

BAY-412 RPH LBB RETRIP-M1	#BO.03	/95.B6	-X41 5	-1XX1 1	4P13
BAY-412 YPH LBB RETRIP-M1	#BO.04	/95.C6	-X41 6		4P15
BAY-412 BPH LBB RETRIP-M1	#BO.05	/95.C6	-X41 8		4P17
BAY-415 RPH LBB RETRIP-M1	#BO.06	/95.C6	-X41 9		4P19
BAY-415 YPH LBB RETRIP-M1	#BO.07	/95.C6	-X41 11	-1XX1 2	4P21
BAY-415 BPH LBB RETRIP-M1	#BO.08	/95.D6	-X41 12		4P23
BAY-426 RPH LBB RETRIP-M1	#BO.09	/95.D6	-X41 14		4P25
BAY-426 YPH LBB RETRIP-M1	#BO.10	/95.E6	-X41 15		4P27
BAY-426 BPH LBB RETRIP-M1	#BO.01	/96.A2	-X61 2	-1XX1 3	4P29
BAY-417 LBB RETRIP-M1	#BO.02	/96.B2	-X61 3		4P31
BAY-435 RPH LBB RETRIP-M1	#BO.03	/96.B2	-X61 5		4P33
BAY-435 YPH LBB RETRIP-M1	#BO.04	/96.B2	-X61 6		4P35

-4X04
18 4P13
19 4P15
20 4P17
21 4P19
22 4P21
23 4P23
24 4P25
25 4P27
26 4P29
27 4P31
28 4P33
29 4P35

K701 /93.A7
+B.09-1XX1:4

NOTE:
1XX1, 7X04 TB GROUP
TO BE ADDED NEW

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

K701 /93.E3
+B.09-1XX1:3

BAY-435 BPH LBB RETRIP-M1	#BO.05	/96.C2	-X61 8	-1XX1 4	4P37
BAY-438 RPH LBB RETRIP-M1	#BO.06	/96.C2	-X61 9		4P39
BAY-438 YPH LBB RETRIP-M1	#BO.07	/96.C2	-X61 11		4P41
BAY-438 BPH LBB RETRIP-M1	#BO.08	/96.D2	-X61 12		4P43
BAY-441 RPH LBB RETRIP-M1	#BO.09	/96.D2	-X61 14	-1XX1 5	4P45
BAY-441 YPH LBB RETRIP-M1	#BO.10	/96.D2	-X61 15		4P47
BAY-441 BPH LBB RETRIP-M1	#BO.11	/96.E2	-X61 17		4P49
BAY-444 RPH LBB RETRIP-M1	#BO.12	/96.E2	-X61 18		4P51
BAY-444 YPH LBB RETRIP-M1	#BO.13	/96.A4	-X62 2	-1XX1 6	4P53
BAY-444 BPH LBB RETRIP-M1	#BO.14	/96.B4	-X62 3		4P55

-4X04
30 4P37
31 4P39
32 4P41
33 4P43
34 4P45
35 4P47
36 4P49
37 4P51
38 4P53
39 4P55

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 93
n. sheet 94

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 4
PSM
90-250VDC

-X11

4 +
5 -
/84.B3
90-250VDC
PE

-X11
2
3 /157.E7
1

BUSBAR RELAY FAULTY	
BUS-4 MAIN-1	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 4
TRM
1A, 50/60Hz

-X401

BAY_412_R PHASE		+ 1		
MYLASANDRA LINE				
P40#AI.01	CT: 1A	- 2	/80.A2	
BAY_412_Y PHASE		+ 3		
MYLASANDRA LINE				
P40#AI.02	CT: 1A	- 4	/80.B2	
BAY_412_B PHASE		+ 5		
MYLASANDRA LINE				
P40#AI.03	CT: 1A	- 6	/80.B2	
BAY_414_R PHASE		+ 7		
FUTURE LINE				
P40#AI.04	CT: 1A	- 8	/80.D2	
BAY_414_Y PHASE		+ 9		
FUTURE LINE				
P40#AI.05	CT: 1A	- 10	/80.D2	
BAY_414_B PHASE		+ 11		
FUTURE LINE				
P40#AI.06	CT: 1A	- 12	/80.E2	
BAY_417_R PHASE		+ 13		
BUS SECTION				
P40#AI.07	CT: 1A	- 14	/81.A2	
BAY_417_Y PHASE		+ 15		
BUS SECTION				
P40#AI.08	CT: 1A	- 16	/81.B2	
BAY_417_B PHASE		+ 17		
BUS SECTION				
P40#AI.09	CT: 1A	- 18	/81.B2	
BAY_426_R PHASE		+ 19		
FILTER-3				
P40#AI.10	CT: 1A	- 20	/81.D2	
BAY_426_Y PHASE		+ 21		
FILTER-3				
P40#AI.11	CT: 1A	- 22	/81.D2	
BAY_426_B PHASE		+ 23		
FILTER-3				
P40#AI.12	CT: 1A	- 24	/81.E2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M1-BUS 4
TRM
1A, 50/60Hz

-X401

BAY_435_R PHASE		+ 1		
FUTURE BAY				
P40#AI.01	CT: 1A	- 2	/82.A2	
BAY_435_Y PHASE		+ 3		
FUTURE BAY				
P40#AI.02	CT: 1A	- 4	/82.B2	
BAY_435_B PHASE		+ 5		
FUTURE BAY				
P40#AI.03	CT: 1A	- 6	/82.B2	
BAY_438_R PHASE		+ 7		
FUTURE BAY				
P40#AI.04	CT: 1A	- 8	/82.D2	
BAY_438_Y PHASE		+ 9		
FUTURE BAY				
P40#AI.05	CT: 1A	- 10	/82.D2	
BAY_438_B PHASE		+ 11		
FUTURE BAY				
P40#AI.06	CT: 1A	- 12	/82.E2	
BAY_441_R PHASE		+ 13		
FUTURE BAY				
P40#AI.07	CT: 1A	- 14	/83.A2	
BAY_441_Y PHASE		+ 15		
FUTURE BAY				
P40#AI.08	CT: 1A	- 16	/83.B2	
BAY_441_B PHASE		+ 17		
FUTURE BAY				
P40#AI.09	CT: 1A	- 18	/83.B2	
BAY_444_R PHASE		+ 19		
FUTURE BAY				
P40#AI.10	CT: 1A	- 20	/83.D2	
BAY_444_Y PHASE		+ 21		
FUTURE BAY				
P40#AI.11	CT: 1A	- 22	/83.D2	
BAY_444_B PHASE		+ 23		
FUTURE BAY				
P40#AI.12	CT: 1A	- 24	/83.E2	

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 94
n. sheet 95

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X31

MAIN 1 BUS 4 PROT IN	P3rBI.01	220-250VDC	1, 2
MAIN 1 BUS 4 PROT OUT	P3rBI.02	220-250VDC	3, 4
SPARE	P3rBI.03	220-250VDC	5, 6
TRIP RELAY OPTD 86A BUS-4	P3rBI.04	220-250VDC	7, 8
SPARE	P3rBI.05	220-250VDC	9, 10
SPARE	P3rBI.06	220-250VDC	11, 12
SPARE	P3rBI.07	220-250VDC	13, 14
REB670 RELAY FAULTY BUS 4 - MAIN 2	P3rBI.08	220-250VDC	15, 16

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X32

BAY412-EXT LBB OPERATED	P3rBI.09	220-250VDC	1, 2
BAY415-EXT LBB OPERATED	P3rBI.10	220-250VDC	3, 4
BAY417-EXT LBB OPERATED	P3rBI.11	220-250VDC	5, 6
BAY426-EXT LBB OPERATED	P3rBI.12	220-250VDC	7, 8
BAY435-EXT LBB OPERATED	P3rBI.13	220-250VDC	9, 10
BAY436-EXT LBB OPERATED	P3rBI.14	220-250VDC	11, 12
BAY441-EXT LBB OPERATED	P3rBI.15	220-250VDC	13, 14
BAY444-EXT LBB OPERATED	P3rBI.16	220-250VDC	15, 16

+D.05 -D00.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X41

BUS-4 BBLSB TRIP TO 86A	#BO.01	1, 2
BUS-4 LBB TRIP RLY RESET	#BO.02	3, 4
BAY-412 BPH LBB RETRIP-01	#BO.03	5, 6
BAY-412 YPH LBB RETRIP-02	#BO.04	7, 8
BAY-412 BPH LBB RETRIP-03	#BO.05	9, 10
BAY-415 BPH LBB RETRIP-04	#BO.06	11, 12
BAY-415 YPH LBB RETRIP-05	#BO.07	13, 14
BAY-415 BPH LBB RETRIP-06	#BO.08	15, 16
BAY-426 BPH LBB RETRIP-07	#BO.09	17, 18
BAY-426 YPH LBB RETRIP-08	#BO.10	19, 20
BUS-4 BBLBB TRIP	#BO.11	21, 22
BUS-4 LBB TRIP RLY RESET	#BO.12	23, 24

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X42

BUSBAR-4 OPTD ANNUNCIAT ON CKT	#BO.13	1, 2
BB-4 CT SUPVN ANNUNCIATION CKT	#BO.14	3, 4
BUSBAR-4 OPTD EVENT LOGGER CKT	#BO.15	5, 6
BB-4 CT SUPVN EVENT LOGGER CKT	#BO.16	7, 8
GENERAL TRIP	#BO.17	9, 10
GENERAL TRIP	#BO.18	11, 12
BB-4 MAIN-1 OPTD TO NTAMC	#BO.19	13, 14
BB-4 MAIN-1 CT SUPVN BLOCK TO NTAMC	#BO.20	15, 16
BB-4 MAIN-1 OUT OF SERVICE TO NTAMC	#BO.21	17, 18
BB-4 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	19, 20
SPARE 2 MI Block	#BO.23	21, 22
SPARE 24 MICZ opld	#BO.24	23, 24

Based on 3100135053	Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW
	Approved 20.04.2023	DEENADAYALAN A	
	Project POWER GRID CORPORATION OF IND A LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formally known as ABB Power Products and Systems India Limited)
Rev. Reason / old	Date	Name	

Doc. kind: Circuit diagram
doc EFS
Resp. dept. PG-GAS
Doc. no 1MNS801837-CGCA
Rev. no 00
Language en
Sheet 95
A sheet 96
Ref Des. =4R

1MYN061003-102(ASIREV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X61

BAY-426 BPH LBB RETRIP-M1	#BO.01	2 / 1	/93.D2
BAY-417 LBB RETRIP-M1	#BO.02	3	/93.E2
BAY-435 RPH LBB RETRIP-M1	#BO.03	5 / 4	/93.E2
BAY-435 YPH LBB RETRIP-M1	#BO.04	6	/93.E2
BAY-435 BPH LBB RETRIP-M1	#BO.05	8 / 7	/93.B6
BAY-438 RPH LBB RETRIP-M1	#BO.06	9	/93.B6
BAY-438 YPH LBB RETRIP-M1	#BO.07	11 / 10	/93.B6
BAY-438 BPH LBB RETRIP-M1	#BO.08	12	/93.C6
BAY-441 RPH LBB RETRIP-M1	#BO.09	14 / 13	/93.C6
BAY-441 YPH LBB RETRIP-M1	#BO.10	15	/93.C6
BAY-441 BPH LBB RETRIP-M1	#BO.11	17 / 16	/93.D6
BAY-444 RPH LBB RETRIP-M1	#BO.12	18	/93.D6

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BOM

-X62

BAY-444 YPH LBB RETRIP-M1	#BO.13	2 / 1	/93.D6
BAY-444 BPH LBB RETRIP-M1	#BO.14	3	/93.E6
BUSBAR-4 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/174.E6
BB-4 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/174.E6
BAY-412 BB/LBB TRIP	#BO.17	8 / 7	
BAY-415 BB/LBB TRIP	#BO.18	9	
BAY-426 BB/LBB TRIP	#BO.19	11 / 10	
BAY-417 BB/LBB TRIP	#BO.20	12	
BAY-435 BB/LBB TRIP	#BO.21	14 / 13	
BAY-438 BB/LBB TRIP	#BO.22	15	
BAY-441 BB/LBB TRIP	#BO.23	17 / 16	
BAY-444 BB/LBB TRIP	#BO.24	18	

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 96
n. sheet 97
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X51

BAY-412 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	/87.B2
BAY-412 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	/87.B2
BAY-412 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	/87.C2
BAY-412 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	/87.C2
BAY-415 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	/87.D2
BAY-415 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	/87.D2
BAY-415 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	/87.E2
BAY-415 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	/87.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X52

SPARE		P5#BI.09	220-250VDC	/88.B2
SPARE		P5#BI.10	220-250VDC	/88.B2
SPARE		P5#BI.11	220-250VDC	/88.C2
BAY-417 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	/88.C2
BAY-426 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	/88.D2
BAY-426 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	/88.D2
BAY-426 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	/88.E2
BAY-426 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	/88.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X71

BAY-435 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	/89.B2
BAY-435 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	/89.B2
BAY-435 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	/89.C2
BAY-435 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	/89.C2
BAY-438 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	/89.D2
BAY-438 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	/89.D2
BAY-438 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	/89.E2
BAY-438 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	/89.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4
BIM
220-250VDC

-X72

BAY-441 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	/90.B2
BAY-441 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	/90.B2
BAY-441 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	/90.C2
BAY-441 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	/90.C2
BAY-444 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	/90.D2
BAY-444 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	/90.D2
BAY-444 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	/90.E2
BAY-444 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	/90.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

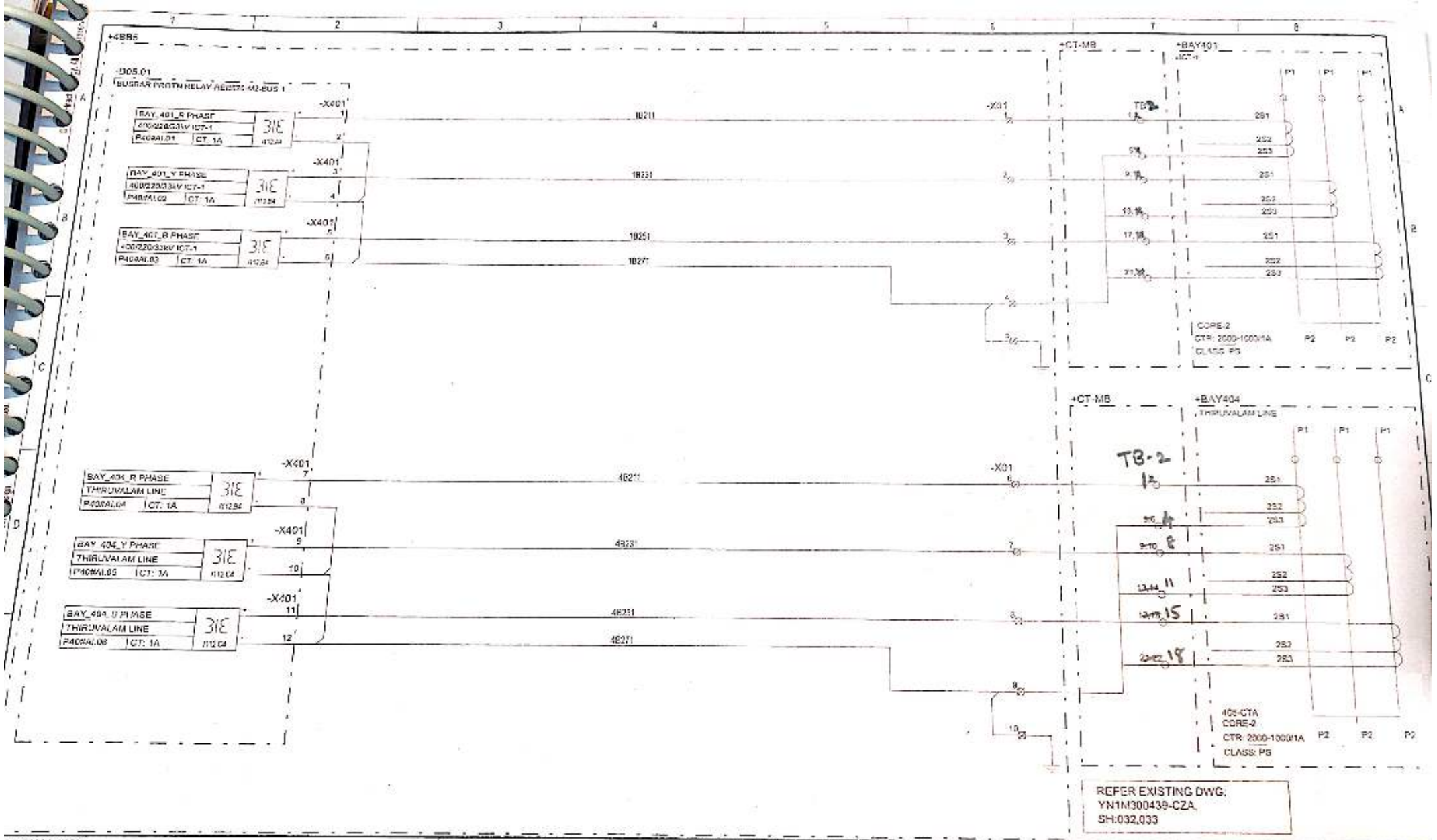
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M1-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 97
n. sheet 98

1MYN691003-102(A3)REV01

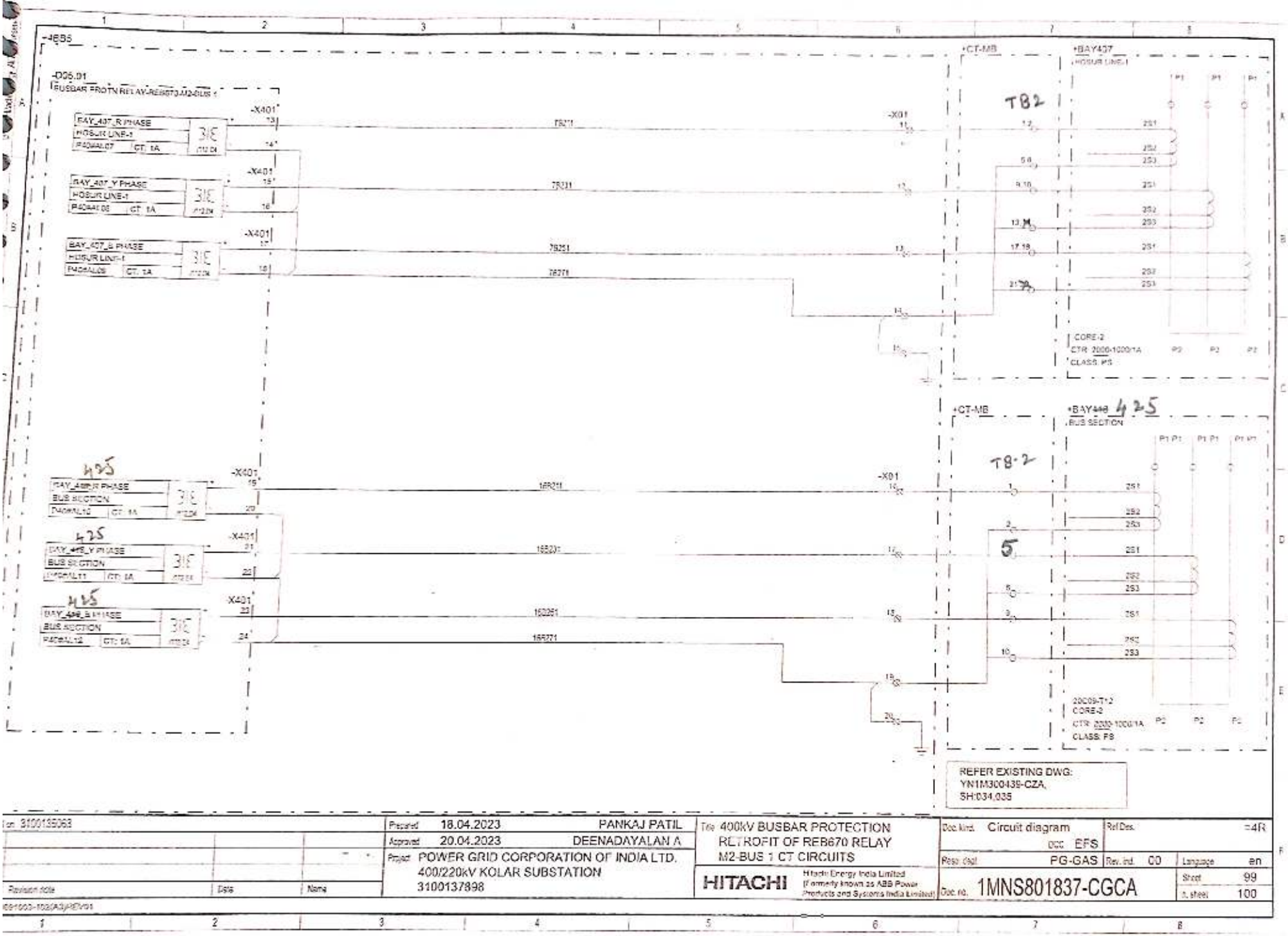
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 CT CIRCUITS	Doc.kind. Circuit diagram DOC EFS	Ref.Des.	
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS	Rev.ind. 00	Language
Revision note / Date / Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA		Sheet / % sheet

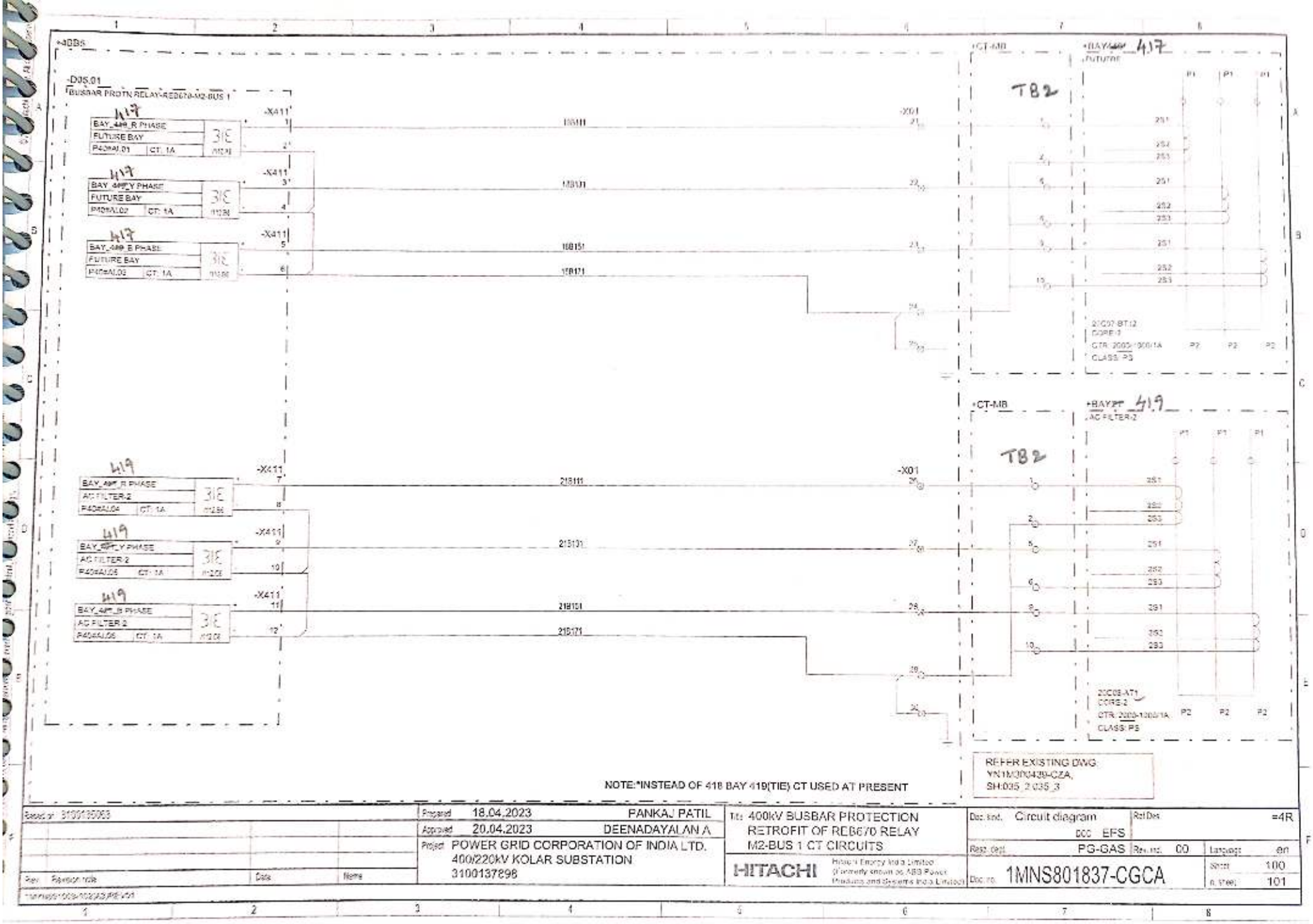
01503-102(A3)REV01

Scanned with OKEN Scanner

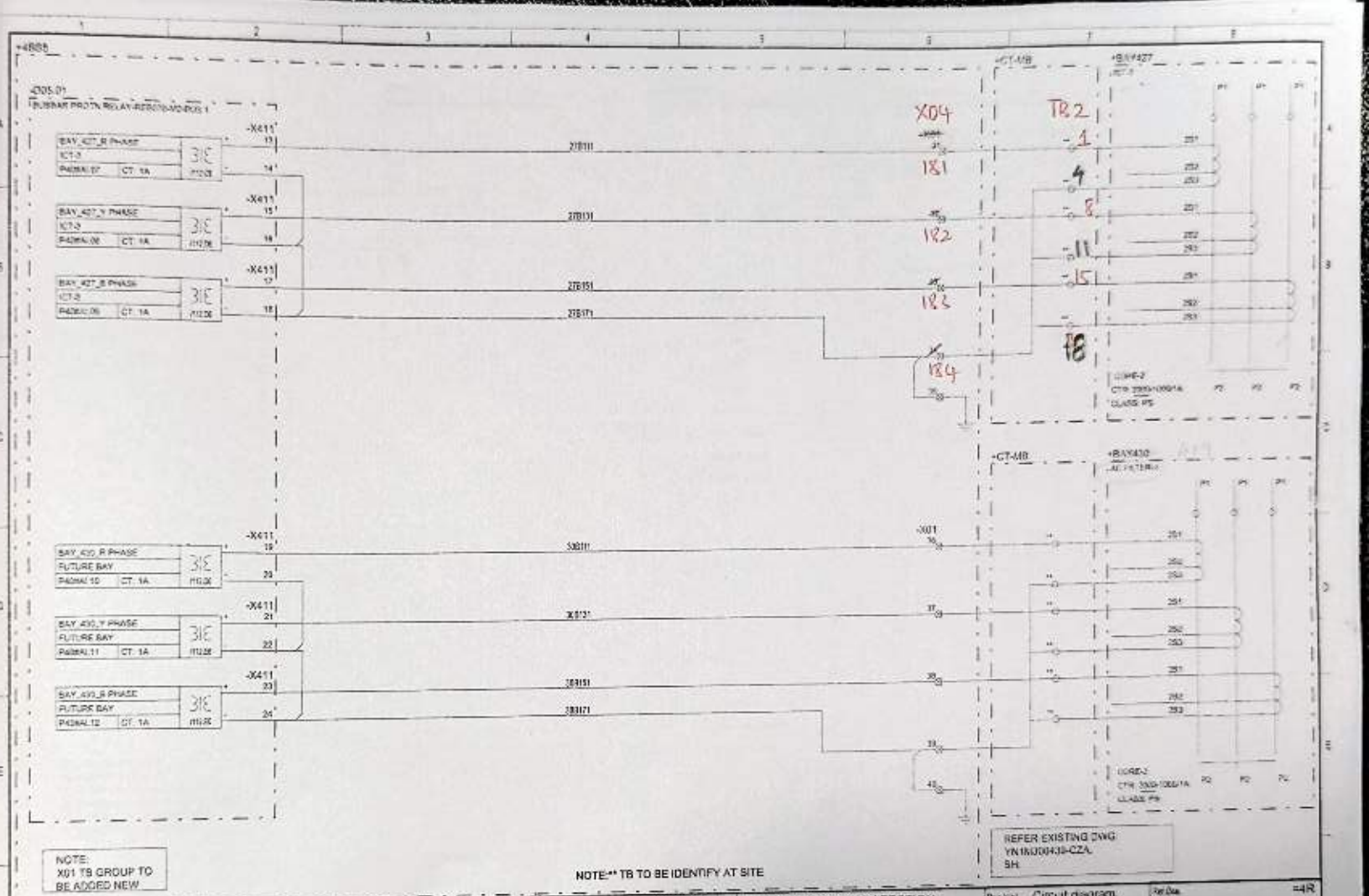


on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 CT CIRCUITS	Doc kind Circuit diagram	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		doc EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp dept PG-GAS	Rev. ind. 00	Language en
Revision note / Date / Name			Doc no. 1MNS801837-CGCA	Sheet 99	
				n. sheet 100	

Scanned with OKEN Scanner



Scanned with OKEN Scanner



Based on 3100135563			Prepared	18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF RE3670 RELAY M2-BUS 1 CT CIRCUITS	Doc kind. Circuit diagram Doc EFS Resp. dept. PG-GAS Doc. no. 1MNS801837-CGCA Rev. no. 00 Language en Sheet 101 No. sheet 102
			Approved	20.04.2023	DEENADAYALAN A		
			Proj.	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137#98		HITACHI	
Rev.	Revision note	Date	Name				

© 2023 Hitachi Energy. All rights reserved.

+4BB5

FROM SH: 031/2

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

-X13 -813-01 -813-02

7 J5 1 2 4A

8 J6 1 2 4A

PSM
-X11
4 +
5 -
90-250VDC

PE
/112.B1

K201 +D.11-D11.02:1P3
/103.A5

K202 +B.05-1XX2:1
/103.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.101.101

Test
Normal

1B	1A	
2B	2A	
3B	3A	/98.A4
4B	4A	/98.B4
5B	5A	/98.B4
6B	6A	/98.B4
7B	7A	/98.D4
8B	8A	/98.D4
9B	9A	/98.E4
10B	10A	/98.E4
11B	11A	/99.A4
12B	12A	/99.B4
13B	13A	/99.B4
14B	14A	/99.B4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.113.101

Test
Normal

1B	1A	
2B	2A	
3B	3A	/99.D4
4B	4A	/99.D4
5B	5A	/99.E4
6B	6A	/99.E4
7B	7A	/100.A4
8B	8A	/100.B4
9B	9A	/100.C4
10B	10A	/100.B4
11B	11A	/100.D4
12B	12A	/100.D4
13B	13A	/100.E4
14B	14A	/100.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.125.101

Test
Normal

1B	1A	
2B	2A	
3B	3A	/101.A4
4B	4A	/101.B4
5B	5A	/101.B4
6B	6A	/101.B4
7B	7A	/101.D4
8B	8A	/101.D4
9B	9A	/101.E4
10B	10A	/101.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 037

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 102
n. sheet 103

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

+D.05-D05.01:5 (-X11) /102.B2
K202

+D.05-D05.01:4 (-X11) /102.B2
K201

-X31 1	MAIN 2 BUS 1 PROT IN	P3#BI.01	220-250VDC	/113.A2
-X31 3	MAIN 2 BUS 1 PROT OUT	P3#BI.02	220-250VDC	/113.B2
-X31 5	SPARE	P3#BI.03	220-250VDC	/113.B2
-X31 7	TRIP RELAY RESET 96B BUS-1	P3#BI.04	220-250VDC	/113.B2
-X31 9	SPARE	P3#BI.05	220-250VDC	/113.C2
-X31 11	SPARE	P3#BI.06	220-250VDC	/113.C2
-X31 13	SPARE	P3#BI.07	220-250VDC	/113.C2
-X31 15	REB670 RELAY FAULTY BUS 1 - MAIN 1	P3#BI.08	220-250VDC	/113.D2

-1XX2 1

K203 -D11.02 1P3 1P4 /103.B8 IN
BB-1 M2 IN/OUT SWITCH

K204 -D11.02 1P2 /103.A8 OUT 1P1
BB-1 M2 IN/OUT SWITCH

K205 -5X04 1
K201 /171.B4

K206 -5X04 2
K206 /171.A1
+D.13-D13.101.101:221

K207 3

K208 4

K209 5

-X14A 3

K210 4

-D11.02
1P2 /103.B4
1P1 C
1P3 1P4 /103.B3
A
2P2
2P1 C
2P3 2P4
A
3P2
3P1 C
3P3 3P4
A
4P2
4P1 C
4P3 4P4
A
IN A
OUT C
BB-1 M2 IN/OUT SWITCH

+4BB1
+D.05
-X14A 3
-X11 2
4 3
1
/40.B2
BB RELAY FAULTY
BUS-1 MAIN-1

NOTE:
5X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 037

+B.05-1XX2:2
/104.A3
K202

+B.17-X04:13
/104.A5
K201

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

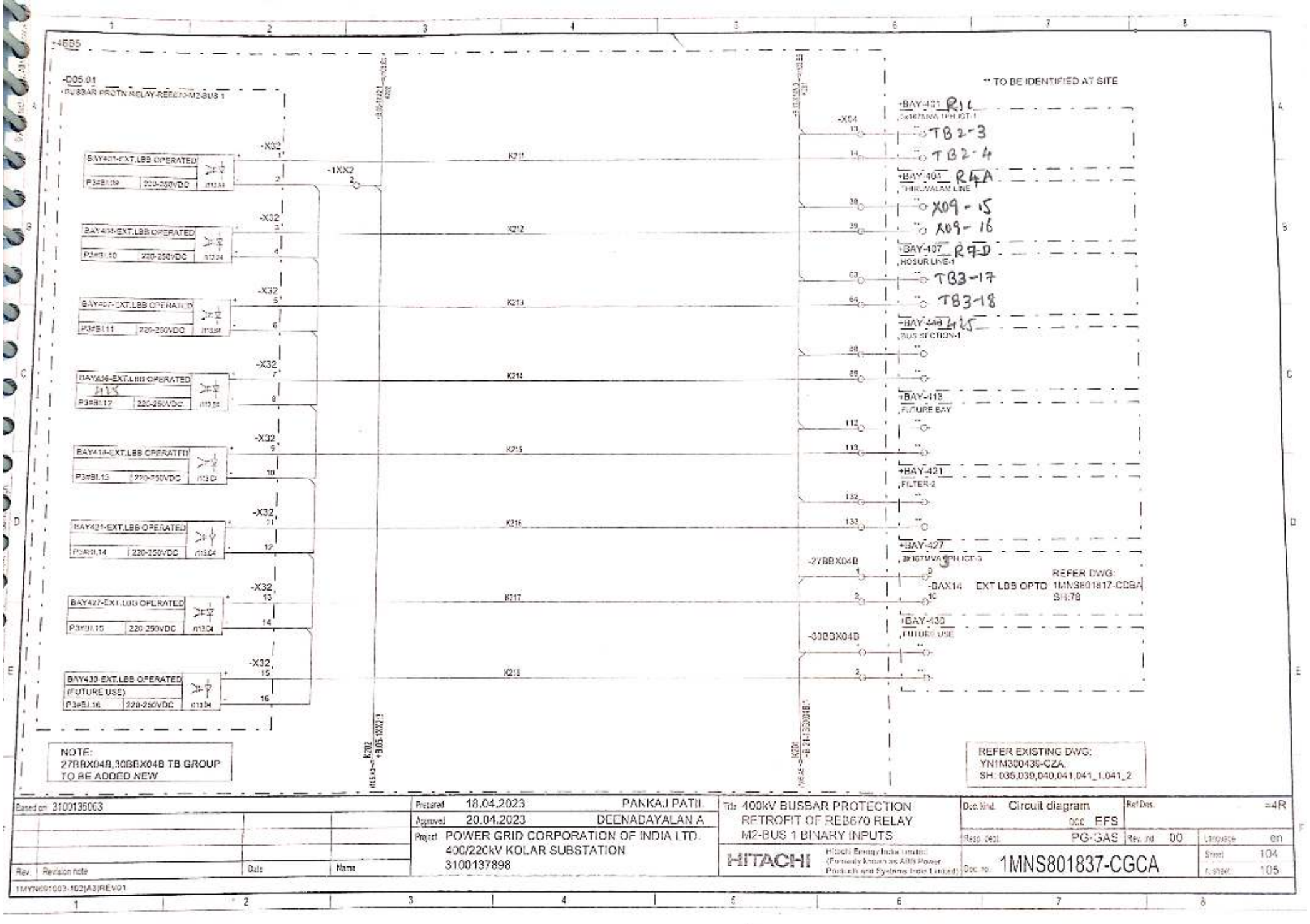
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 103
Doc. no. 1MNS801837-CGCA
n. sheet 104

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135003	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS	Doc kind Circuit diagram	Ref Des. =4R	
	Approved 20.04.2023 DEENADAYALAN A		Doc cat. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/22kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind 00	Language en
			Doc. no. 1MNS801837-CGCA	Sheet 104	
Rev. Revision note Date Name				f. sheet 105	

1MYN691003-162|A3|REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /104.E3
+B.05-1XX2:2

K201 /104.E5
+B.33-30BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X51 + 1	K219	-1XX2 3
P5#BI.01	220-250VDC	- 2		/115.A2
SPARE		-X51 + 3	K220	
P5#BI.02	220-250VDC	- 4		/115.B2
SPARE		-X51 + 5	K221	
P5#BI.03	220-250VDC	- 6		/115.B2
BAY-401 3PH LBB INIT. (FUTURE USE)		-X51 + 7	K222	
P5#BI.04	220-250VDC	- 8		/115.B2
BAY-404 RPH LBB INIT. (FUTURE USE)		-X51 + 9	K223	
P5#BI.05	220-250VDC	- 10		/115.C2
BAY-404 YPH LBB INIT. (FUTURE USE)		-X51 + 11	K224	
P5#BI.06	220-250VDC	- 12		/115.C2
BAY-404 BPH LBB INIT. (FUTURE USE)		-X51 + 13	K225	
P5#BI.07	220-250VDC	- 14		/115.C2
BAY-404 3PH LBB INIT. (FUTURE USE)		-X51 + 15	K226	
P5#BI.08	220-250VDC	- 16		/115.D2

-1BBX04B
1 2 3 4 5 → ** ** ** ** **

+BAY-401
3x167MVA 1PH ICT-1
REF.DRG.NO:####
SHT.NO:##

-4BBX04B
1 2 3 4 5 → ** ** ** ** **

+BAY-404
THIRUVALAM LINE
REF.DRG.NO:####
SHT.NO:##

NOTE:
1BBX04B,4BBX04B TB GROUP
TO BE ADDED NEW

K202 /106.A3
+B.05-1XX2:4

K201 /106.A5
+B.25-7BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 105
n. sheet 106
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /105.E3
+B.05-1XX2:3

K201 /105.E5
+B.21-4BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-407 RPH LBB INIT.		-X52	1	+
(FUTURE USE)				
P5#BI.09	220-250VDC	/115.A4	2	-

-1XX2 4

K227

-7BBX04B 1

+BAY-407
HOSUR LINE-1
REF.DRG.NO:####
SHT.NO:##

BAY-407 YPH LBB INIT.		-X52	3	+
(FUTURE USE)				
P5#BI.10	220-250VDC	/115.B4	4	-

K228

BAY-407 BPH LBB INIT.		-X52	5	+
(FUTURE USE)				
P5#BI.11	220-250VDC	/115.B4	6	-

K229

BAY-407 3PH LBB INIT.		-X52	7	+
(FUTURE USE)				
P5#BI.12	220-250VDC	/115.B4	8	-

K230

SPARE		-X52	9	+
P5#BI.13	220-250VDC	/115.C4	10	-

K231

SPARE		-X52	11	+
P5#BI.14	220-250VDC	/115.C4	12	-

K232

SPARE		-X52	13	+
P5#BI.15	220-250VDC	/115.C4	14	-

K233

BAY-416 3PH LBB INIT.		-X52	15	+
(FUTURE USE)				
P5#BI.16	220-250VDC	/115.D4	16	-

K234

-10BBX04B 1

+BAY-416
BUS SECTION-1
REF.DRG.NO:####
SHT.NO:##

NOTE:
7BBX04B,10BBX04B TB GROUP
TO BE ADDED NEW

K202 /107.A3
+B.05-1XX2:5

K201 /107.A5
+B.29-18BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 106
n. sheet 107

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /106.E3
+B.05-1XX2:4

K201 /106.E5
+B.25-10BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-419 RPH LBB INIT.		-X71 + 1	K235	-18BBX04B 1
(FUTURE USE)				2
P7#BI.01	220-250VDC	/115.A6 - 2	-1XX2 5	
BAY-419 YPH LBB INIT.		-X71 + 3	K236	3
(FUTURE USE)				
P7#BI.02	220-250VDC	/115.B6 - 4		
BAY-419 BPH LBB INIT.		-X71 + 5	K237	4
(FUTURE USE)				
P7#BI.03	220-250VDC	/115.B6 - 6		
BAY-419 3PH LBB INIT.		-X71 + 7	K238	5
(FUTURE USE)				
P7#BI.04	220-250VDC	/115.B6 - 8		

+BAY-419
TIE BAY
REF.DRG.NO:####
SHT.NO:##

BAY-421 RPH LBB INIT.		-X71 + 9	K239	-21BBX04B 1
(FUTURE USE)				2
P7#BI.05	220-250VDC	/115.C6 - 10		
BAY-421 YPH LBB INIT.		-X71 + 11	K240	3
(FUTURE USE)				
P7#BI.06	220-250VDC	/115.C6 - 12		
BAY-421 BPH LBB INIT.		-X71 + 13	K241	4
(FUTURE USE)				
P7#BI.07	220-250VDC	/115.C6 - 14		
BAY-421 3PH LBB INIT.		-X71 + 15	K242	5
(FUTURE USE)				
P7#BI.08	220-250VDC	/115.D6 - 16		

+BAY-421
FILTER-2
REF.DRG.NO:####
SHT.NO:##

NOTE:
18BBX04B,21BBX04B TB GROUP
TO BE ADDED NEW

K202 /108.A3
+B.05-1XX2:6

K201 /108.A5
+B.33-27BBX04B:3

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 107
n. sheet 108

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K202 /107.E3
+B.05-1XX2:5

K201 /107.E5
+B.29-21BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X72	1	+	K243
P7#BI.09	220-250VDC	/115.A7	2	-	-1XX2 6
SPARE		-X72	3	+	K244
P7#BI.10	220-250VDC	/115.B7	4	-	
SPARE		-X72	5	+	K245
P7#BI.11	220-250VDC	/115.B7	6	-	
BAY-427 3PH LBB INIT.		-X72	7	+	K246
(FUTURE USE)					
P7#BI.12	220-250VDC	/115.B7	8	-	
BAY-430 RPH LBB INIT.		-X72	9	+	K247
(FUTURE USE)					
P7#BI.13	220-250VDC	/115.C7	10	-	
BAY-430 YPH LBB INIT.		-X72	11	+	K248
(FUTURE USE)					
P7#BI.14	220-250VDC	/115.C7	12	-	
BAY-430 BPH LBB INIT.		-X72	13	+	K249
(FUTURE USE)					
P7#BI.15	220-250VDC	/115.C7	14	-	
BAY-430 3PH LBB INIT.		-X72	15	+	K250
(FUTURE USE)					
P7#BI.16	220-250VDC	/115.D7	16	-	

-27BBX04B

+BAY-427
3x167MVA 1PH ICT-3
REF.DRG.NO:####
SHT.NO:##

-30BBX04B

+BAY-430
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

NOTE:
27BBX04B,30BBX04B TB GROUP
TO BE ADDED NEW

K202 /110.A5 +B.17-X04:154

K201 /110.A5 +D.05-D05.01:2 (-X41)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

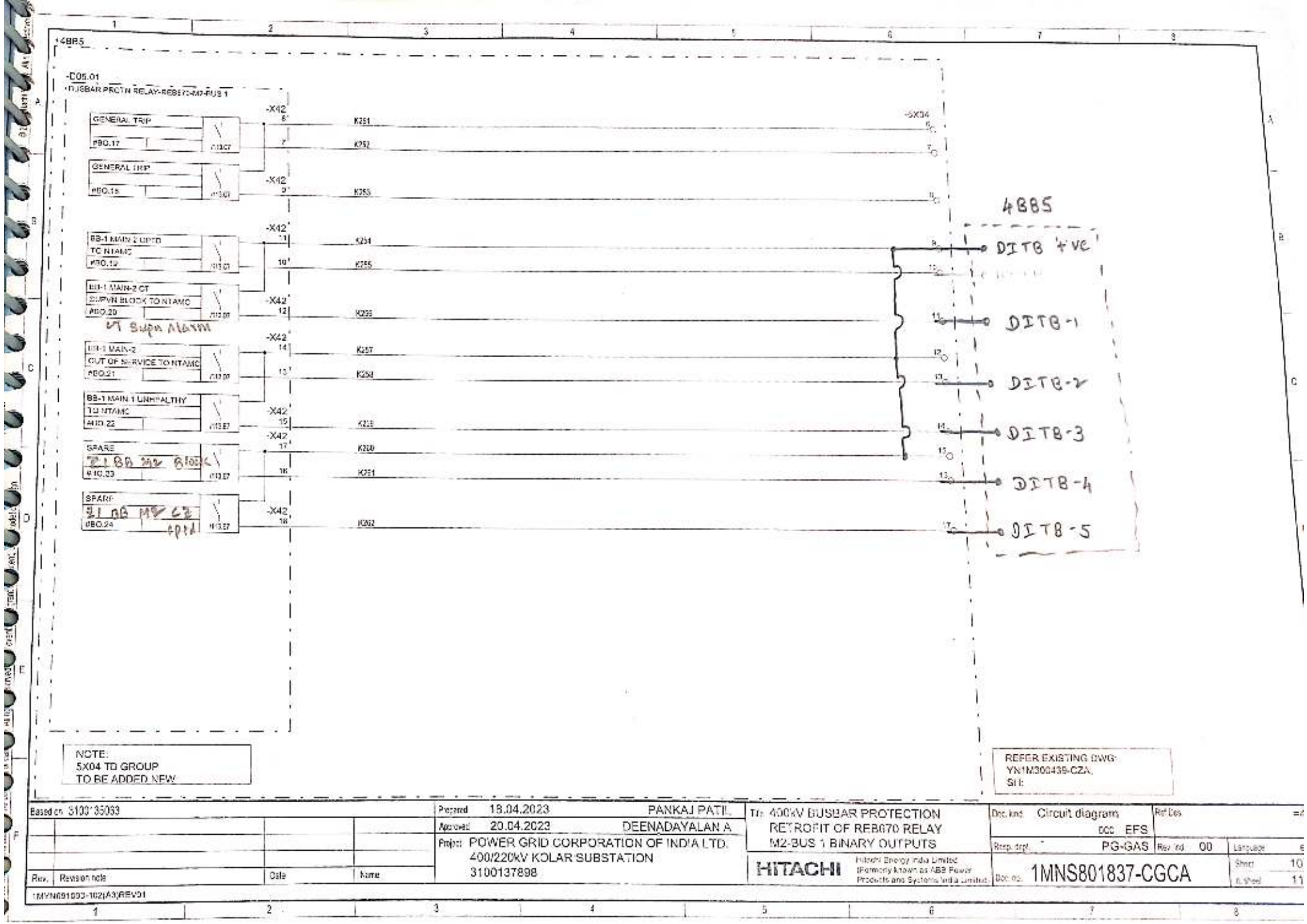
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY INPUTS

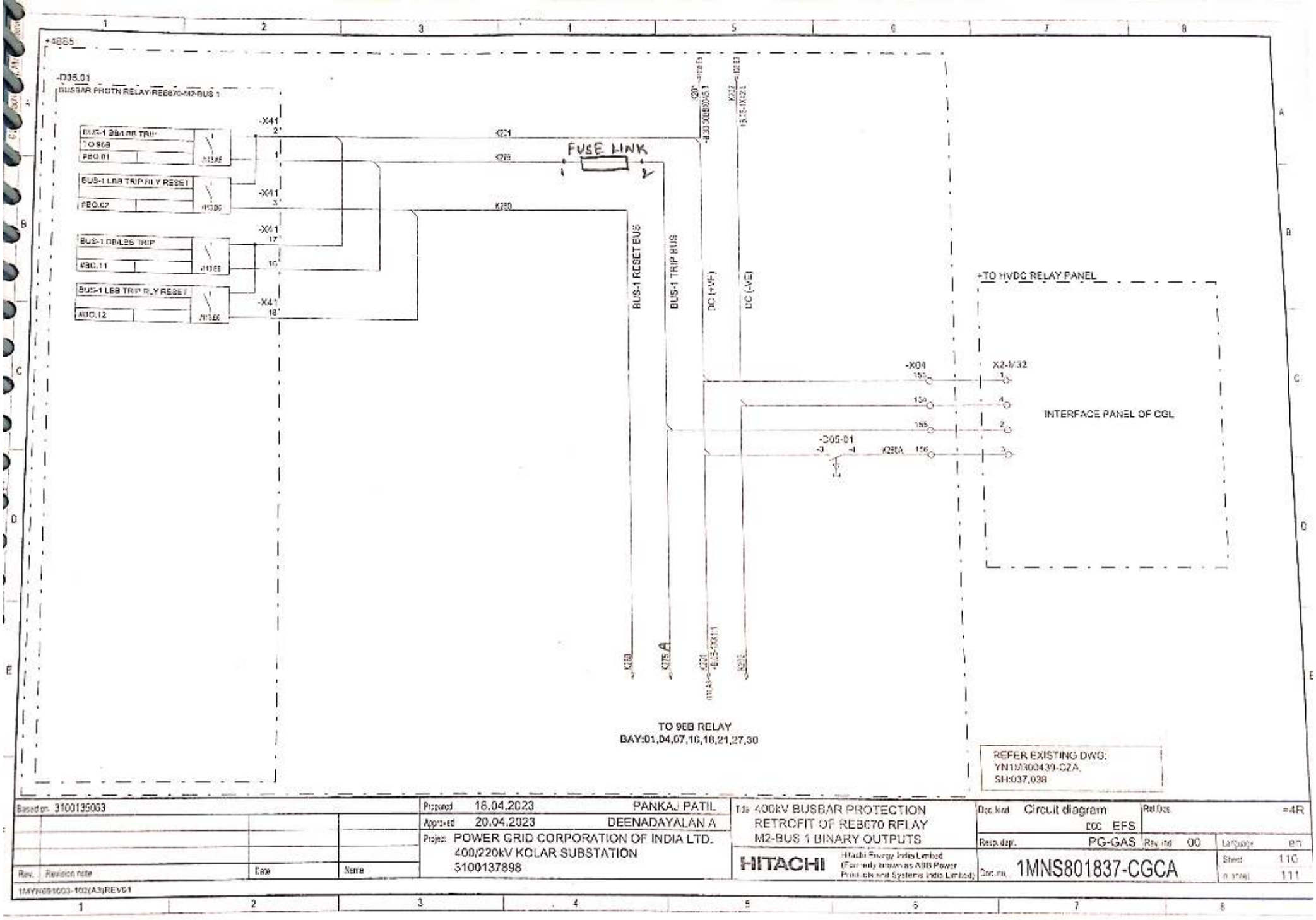
HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 108
n. sheet 109
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01



Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K201 ◁/110.E5
-D05-01:-3

BAY-401 LBB RETRIP-M2	#BO.03	/113.B6	-X41 5 / 4	-1XX1 1	5P13 → -5X04 18
BAY-404 RPH LBB RETRIP-M2	#BO.04	/113.C6	-X41 6		5P15 → 19
BAY-404 YPH LBB RETRIP-M2	#BO.05	/113.C6	-X41 8 / 7		5P17 → 20
BAY-404 BPH LBB RETRIP-M2	#BO.06	/113.C6	-X41 9		5P19 → 21
BAY-407 RPH LBB RETRIP-M2	#BO.07	/113.C6	-X41 11 / 10	-1XX1 2	5P21 → 22
BAY-407 YPH LBB RETRIP-M2	#BO.08	/113.D6	-X41 12		5P23 → 23
BAY-407 BPH LBB RETRIP-M2	#BO.09	/113.D6	-X41 14 / 13		5P25 → 24
BAY-416 LBB RETRIP-M2	#BO.10	/113.E6	-X41 15		5P27 → 25

K201 ◁/111.A6
+B.05-1XX1:3

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

K201 ◁/111.E3
+B.05-1XX1:2

BAY-419 RPH LBB RETRIP-M2	#BO.01	/114.A2	-X61 2 / 1	-1XX1 3	5P29 → -5X04 26
BAY-419 YPH LBB RETRIP-M2	#BO.02	/114.B2	-X61 3		5P31 → 27
BAY-419 BPH LBB RETRIP-M2	#BO.03	/114.B2	-X61 5 / 4		5P33 → 28
BAY-421 RPH LBB RETRIP-M2	#BO.04	/114.C2	-X61 6		5P35 → 29
BAY-421 YPH LBB RETRIP-M2	#BO.05	/114.C2	-X61 8 / 7	-1XX1 4	5P37 → 30
BAY-421 BPH LBB RETRIP-M2	#BO.06	/114.C2	-X61 9		5P39 → 31
BAY-427 LBB RETRIP-M2	#BO.07	/114.C2	-X61 11 / 10		5P41 → 32
BAY-430 RPH LBB RETRIP-M2	#BO.08	/114.D2	-X61 12		5P43 → 33
BAY-430 YPH LBB RETRIP-M2	#BO.09	/114.D2	-X61 14 / 13	-1XX1 5	5P45 → 34
BAY-430 BPH LBB RETRIP-M2	#BO.10	/114.E2	-X61 15		5P47 → 35

NOTE:
1XX1, 5X04 TB GROUP
TO BE ADDED NEW

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 111
n. sheet 112

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 1
PSM
90-250VDC

-X11

4 +
5 -
/102.B3
90-250VDC
PE

-X11
2
3 /31.E7
1

BB RELAY FAULTY
BUS-1 MAIN2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 1
TRM
1A, 50/60Hz

-X401

BAY_401_R PHASE		+ 1		
400/220/33kV ICT-1				
P40#AI.01	CT: 1A	- 2		/98.A2
BAY_401_Y PHASE		+ 3		
400/220/33kV ICT-1				
P40#AI.02	CT: 1A	- 4		/98.B2
BAY_401_B PHASE		+ 5		
400/220/33kV ICT-1				
P40#AI.03	CT: 1A	- 6		/98.B2
BAY_404_R PHASE		+ 7		
THIRUVALAM LINE				
P40#AI.04	CT: 1A	- 8		/98.D2
BAY_404_Y PHASE		+ 9		
THIRUVALAM LINE				
P40#AI.05	CT: 1A	- 10		/98.D2
BAY_404_B PHASE		+ 11		
THIRUVALAM LINE				
P40#AI.06	CT: 1A	- 12		/98.E2
BAY_407_R PHASE		+ 13		
HOSUR LINE-1				
P40#AI.07	CT: 1A	- 14		/99.A2
BAY_407_Y PHASE		+ 15		
HOSUR LINE-1				
P40#AI.08	CT: 1A	- 16		/99.B2
BAY_407_B PHASE		+ 17		
HOSUR LINE-1				
P40#AI.09	CT: 1A	- 18		/99.B2
BAY_416_R PHASE		+ 19		
BUS SECTION				
P40#AI.10	CT: 1A	- 20		/99.D2
BAY_416_Y PHASE		+ 21		
BUS SECTION				
P40#AI.11	CT: 1A	- 22		/99.D2
BAY_416_B PHASE		+ 23		
BUS SECTION				
P40#AI.12	CT: 1A	- 24		/99.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 1
TRM
1A, 50/60Hz

-X411

BAY_419_R PHASE		+ 1		
FUTURE BAY				
P40#AI.01	CT: 1A	- 2		/100.A2
BAY_419_Y PHASE		+ 3		
FUTURE BAY				
P40#AI.02	CT: 1A	- 4		/100.B2
BAY_419_B PHASE		+ 5		
FUTURE BAY				
P40#AI.03	CT: 1A	- 6		/100.B2
BAY_421_R PHASE		+ 7		
AC FILTER-2				
P40#AI.04	CT: 1A	- 8		/100.D2
BAY_421_Y PHASE		+ 9		
AC FILTER-2				
P40#AI.05	CT: 1A	- 10		/100.D2
BAY_421_B PHASE		+ 11		
AC FILTER-2				
P40#AI.06	CT: 1A	- 12		/100.E2
BAY_427_R PHASE		+ 13		
ICT-3				
P40#AI.07	CT: 1A	- 14		/101.A2
BAY_427_Y PHASE		+ 15		
ICT-3				
P40#AI.08	CT: 1A	- 16		/101.B2
BAY_427_B PHASE		+ 17		
ICT-3				
P40#AI.09	CT: 1A	- 18		/101.B2
BAY_430_R PHASE		+ 19		
FUTURE BAY				
P40#AI.10	CT: 1A	- 20		/101.D2
BAY_430_Y PHASE		+ 21		
FUTURE BAY				
P40#AI.11	CT: 1A	- 22		/101.D2
BAY_430_B PHASE		+ 23		
FUTURE BAY				
P40#AI.12	CT: 1A	- 24		/101.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 112
n. sheet 113

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X31

MAIN 2 BUS 1 PROT IN	P3#BI.01	220-250VDC	+ 1 - 2	/103.B2
MAIN 2 BUS 1 PROT OUT	P3#BI.02	220-250VDC	+ 3 - 4	/103.B2
SPARE	P3#BI.03	220-250VDC	+ 5 - 6	/103.C2
TRIP RELAY RESET 96B BUS-1	P3#BI.04	220-250VDC	+ 7 - 8	/103.C2
SPARE	P3#BI.05	220-250VDC	+ 9 - 10	/103.C2
SPARE	P3#BI.06	220-250VDC	+ 11 - 12	/103.D2
SPARE	P3#BI.07	220-250VDC	+ 13 - 14	/103.D2
REB670 RELAY FAULTY BUS 1 - MAIN 1	P3#BI.08	220-250VDC	+ 15 - 16	/103.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X32

BAY401-EXT.LBB OPERATED	P3#BI.09	220-250VDC	+ 1 - 2	/104.B2
BAY404-EXT.LBB OPERATED	P3#BI.10	220-250VDC	+ 3 - 4	/104.B2
BAY407-EXT.LBB OPERATED	P3#BI.11	220-250VDC	+ 5 - 6	/104.C2
BAY416-EXT.LBB OPERATED	P3#BI.12	220-250VDC	+ 7 - 8	/104.C2
BAY418-EXT.LBB OPERATED	P3#BI.13	220-250VDC	+ 9 - 10	/104.D2
BAY421-EXT.LBB OPERATED	P3#BI.14	220-250VDC	+ 11 - 12	/104.D2
BAY427-EXT.LBB OPERATED	P3#BI.15	220-250VDC	+ 13 - 14	/104.E2
BAY430-EXT.LBB OPERATED (FUTURE USE)	P3#BI.16	220-250VDC	+ 15 - 16	/104.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

-X41

BUS-1 BB/LBB TRIP TO 96B	#BO.01	2 1	/110.B2
BUS-1 LBB TRIP RLY RESET	#BO.02	3	/110.B2
BAY-401 LBB RETRIP-M2	#BO.03	5 4	/111.B2
BAY-404 RPH LBB RETRIP-M2	#BO.04	6	/111.B2
BAY-404 YPH LBB RETRIP-M2	#BO.05	8 7	/111.B2
BAY-404 BPH LBB RETRIP-M2	#BO.06	9	/111.C2
BAY-407 RPH LBB RETRIP-M2	#BO.07	11 10	/111.C2
BAY-407 YPH LBB RETRIP-M2	#BO.08	12	/111.C2
BAY-407 BPH LBB RETRIP-M2	#BO.09	14 13	/111.D2
BAY-416 LBB RETRIP-M2	#BO.10	15	/111.D2
BUS-1 BB/LBB TRIP	#BO.11	17 16	/110.B2
BUS-1 LBB TRIP RLY RESET	#BO.12	18	/110.C2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

-X42

BUSBAR-1 OPTD ANNUNCIATION CKT	#BO.13	2 1	/173.B5
BB-1 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.C5
BUSBAR-1 Rph OPTD EVENT LOGGER CKT	#BO.15	5 4	/175.A2
BUSBAR-1 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.B2
GENERAL TRIP	#BO.17	8 7	/109.A2
GENERAL TRIP	#BO.18	9	/109.B2
BB-1 MAIN-2 OPTD TO NTAMC	#BO.19	11 10	/109.B2
BB-1 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/109.C2
BB-1 MAIN-2 OUT OF SERVICE TO NTAMC	#BO.21	14 13	/109.C2
BB-1 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/109.C2
SPARE	#BO.23	17 16	/109.D2
SPARE	#BO.24	18	/109.D2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 113
n. sheet 114

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

-X61

BAY-419 RPH LBB RETRIP-M2 / #BO.01	2 / 1	/111.B5	
BAY-419 YPH LBB RETRIP-M2 / #BO.02	3	/111.B5	
BAY-419 BPH LBB RETRIP-M2 / #BO.03	5 / 4	/111.B5	
BAY-421 RPH LBB RETRIP-M2 / #BO.04	6	/111.C5	
BAY-421 YPH LBB RETRIP-M2 / #BO.05	8 / 7	/111.C5	
BAY-421 BPH LBB RETRIP-M2 / #BO.06	9	/111.C5	
BAY-427 LBB RETRIP-M2 / #BO.07	11 / 10	/111.D5	
BAY-430 RPH LBB RETRIP-M2 / #BO.08	12	/111.D5	
BAY-430 YPH LBB RETRIP-M2 / #BO.09	14 / 13	/111.D5	
BAY-430 BPH LBB RETRIP-M2 / #BO.10	15	/111.E5	
BUSBAR-1 Bph OPTD / EVENT LOGGER CKT / #BO.11	17 / 16	/175.B2	
BB-1 CT SUPVN / EVENT LOGGER CKT / #BO.12	18	/175.B2	

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BOM

X62

SPARE / #BO.13	2 / 1		
SPARE / #BO.14	3		
SPARE / #BO.15	5 / 4		
SPARE / #BO.16	6		
SPARE / #BO.17	8 / 7		
SPARE / #BO.18	9		
SPARE / #BO.19	11 / 10		
SPARE / #BO.20	12		
SPARE / #BO.21	14 / 13		
SPARE / #BO.22	15		
SPARE / #BO.23	17 / 16		
SPARE / #BO.24	18		

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 114
n. sheet 115

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X51

SPARE	P5#BI.01	220-250VDC	1 / 2	/105.B2
SPARE	P5#BI.02	220-250VDC	3 / 4	/105.B2
SPARE	P5#BI.03	220-250VDC	5 / 6	/105.C2
BAY-401 3PH LBB INIT. (FUTURE USE)	P5#BI.04	220-250VDC	7 / 8	/105.C2
BAY-404 RPH LBB INIT. (FUTURE USE)	P5#BI.05	220-250VDC	9 / 10	/105.D2
BAY-404 YPH LBB INIT. (FUTURE USE)	P5#BI.06	220-250VDC	11 / 12	/105.D2
BAY-404 BPH LBB INIT. (FUTURE USE)	P5#BI.07	220-250VDC	13 / 14	/105.E2
BAY-404 3PH LBB INIT. (FUTURE USE)	P5#BI.08	220-250VDC	15 / 16	/105.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X52

BAY-407 RPH LBB INIT. (FUTURE USE)	P5#BI.09	220-250VDC	1 / 2	/106.B2
BAY-407 YPH LBB INIT. (FUTURE USE)	P5#BI.10	220-250VDC	3 / 4	/106.B2
BAY-407 BPH LBB INIT. (FUTURE USE)	P5#BI.11	220-250VDC	5 / 6	/106.C2
BAY-407 3PH LBB INIT. (FUTURE USE)	P5#BI.12	220-250VDC	7 / 8	/106.C2
SPARE	P5#BI.13	220-250VDC	9 / 10	/106.D2
SPARE	P5#BI.14	220-250VDC	11 / 12	/106.D2
SPARE	P5#BI.15	220-250VDC	13 / 14	/106.E2
BAY-416 3PH LBB INIT. (FUTURE USE)	P5#BI.16	220-250VDC	15 / 16	/106.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X71

BAY-419 RPH LBB INIT. (FUTURE USE)	P7#BI.01	220-250VDC	1 / 2	/107.B2
BAY-419 YPH LBB INIT. (FUTURE USE)	P7#BI.02	220-250VDC	3 / 4	/107.B2
BAY-419 BPH LBB INIT. (FUTURE USE)	P7#BI.03	220-250VDC	5 / 6	/107.C2
BAY-419 3PH LBB INIT. (FUTURE USE)	P7#BI.04	220-250VDC	7 / 8	/107.C2
BAY-421 RPH LBB INIT. (FUTURE USE)	P7#BI.05	220-250VDC	9 / 10	/107.D2
BAY-421 YPH LBB INIT. (FUTURE USE)	P7#BI.06	220-250VDC	11 / 12	/107.D2
BAY-421 BPH LBB INIT. (FUTURE USE)	P7#BI.07	220-250VDC	13 / 14	/107.E2
BAY-421 3PH LBB INIT. (FUTURE USE)	P7#BI.08	220-250VDC	15 / 16	/107.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1
BIM
220-250VDC

-X72

SPARE	P7#BI.09	220-250VDC	1 / 2	/108.B2
SPARE	P7#BI.10	220-250VDC	3 / 4	/108.B2
SPARE	P7#BI.11	220-250VDC	5 / 6	/108.C2
BAY-427 3PH LBB INIT. (FUTURE USE)	P7#BI.12	220-250VDC	7 / 8	/108.C2
BAY-430 RPH LBB INIT. (FUTURE USE)	P7#BI.13	220-250VDC	9 / 10	/108.D2
BAY-430 YPH LBB INIT. (FUTURE USE)	P7#BI.14	220-250VDC	11 / 12	/108.D2
BAY-430 BPH LBB INIT. (FUTURE USE)	P7#BI.15	220-250VDC	13 / 14	/108.E2
BAY-430 3PH LBB INIT. (FUTURE USE)	P7#BI.16	220-250VDC	15 / 16	/108.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

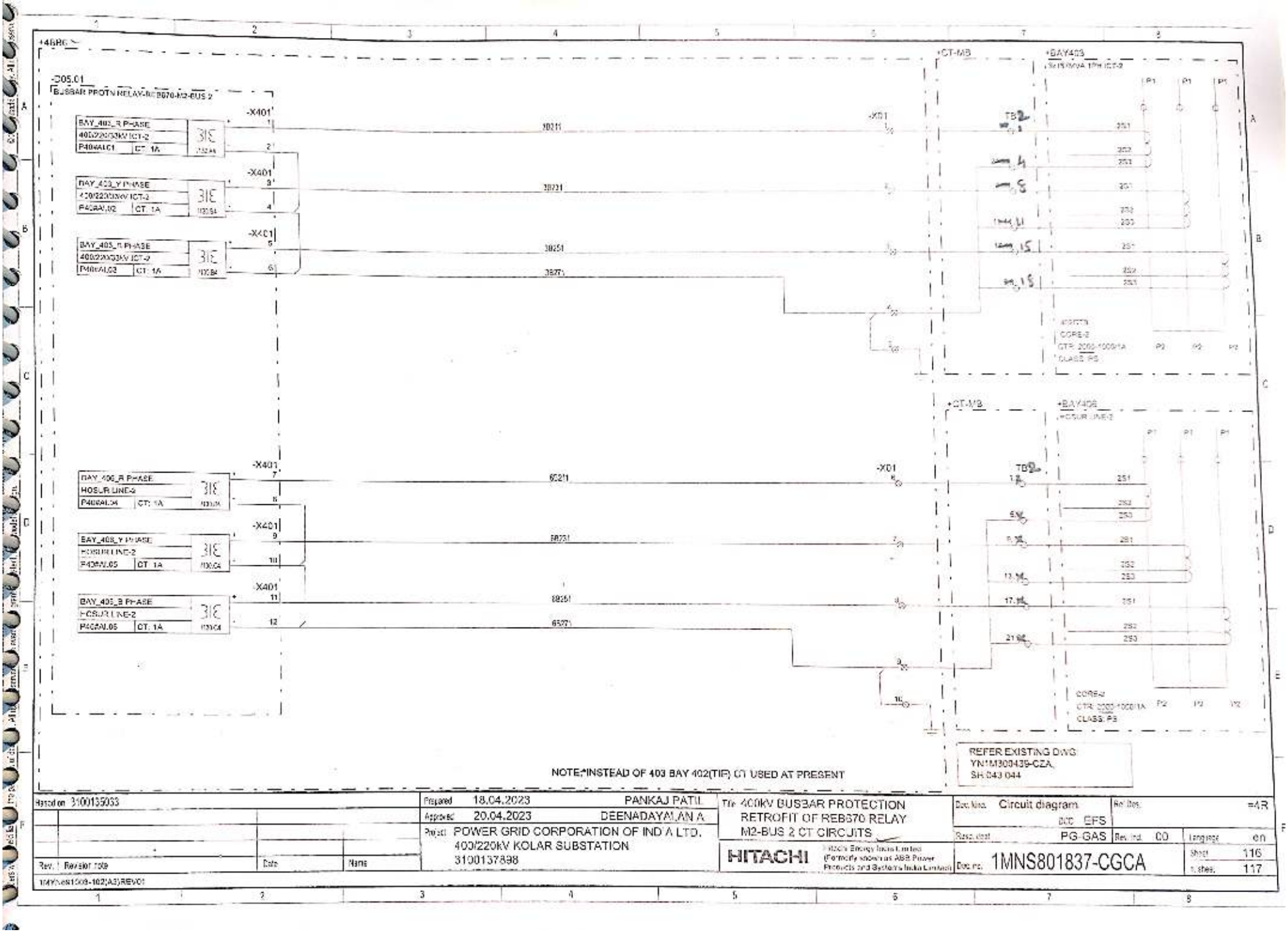
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 1 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 115
n. sheet 116

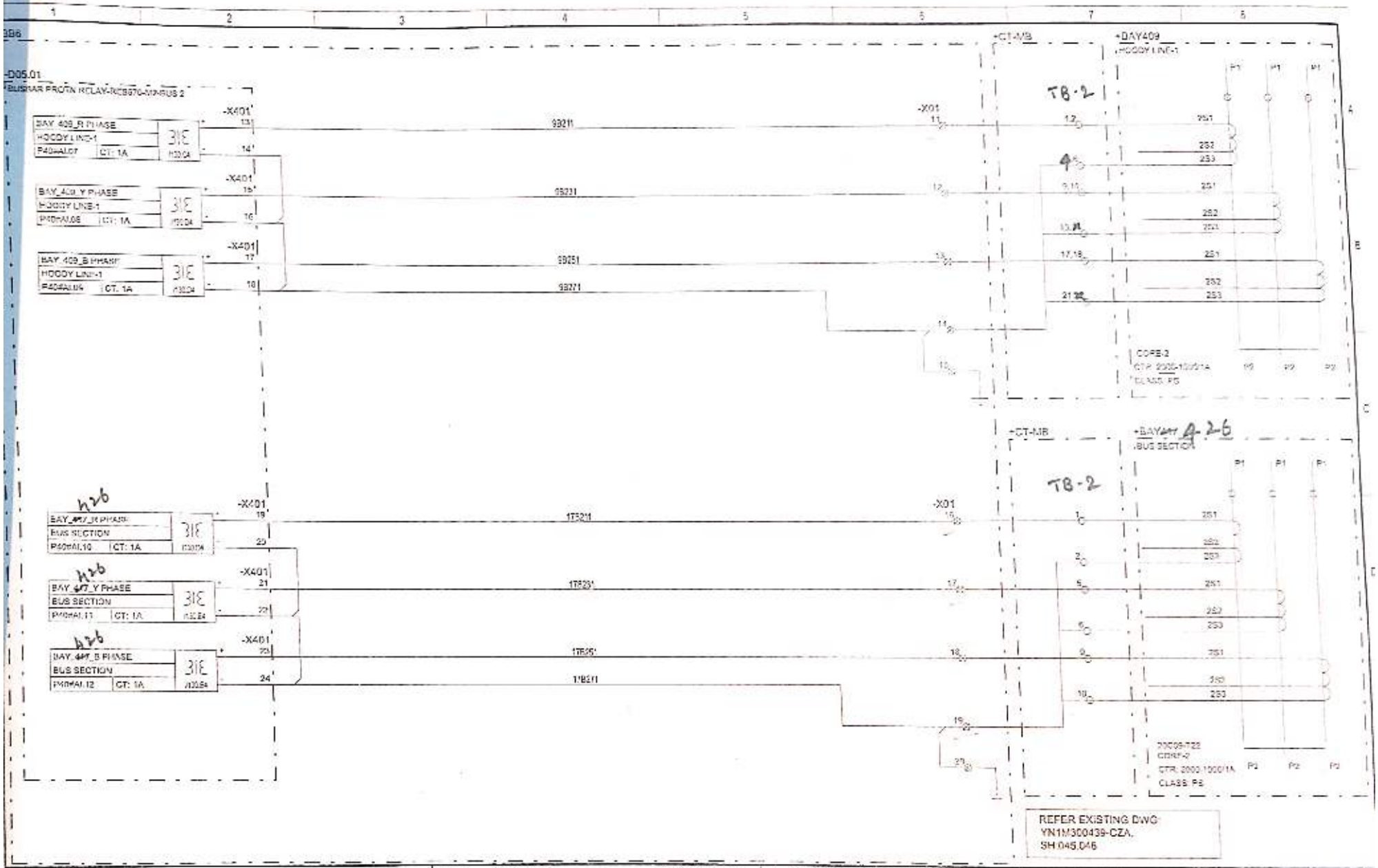
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Based on 3100135033		Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Ref Des.	=AR
		Approved 20.04.2023	DEENADAYALAN A		doc CFS		
		Project POWER GRID CORPORATION OF IND A LTD. 400/220kV KOLAR SUBSTATION 3100137898			Resp dept PG-GAS	Rev ind. 00	Language en
Rev. Revision note	Date	Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Sheet 116	
1MNS801509-102(A3)REV01						No. sheet 117	

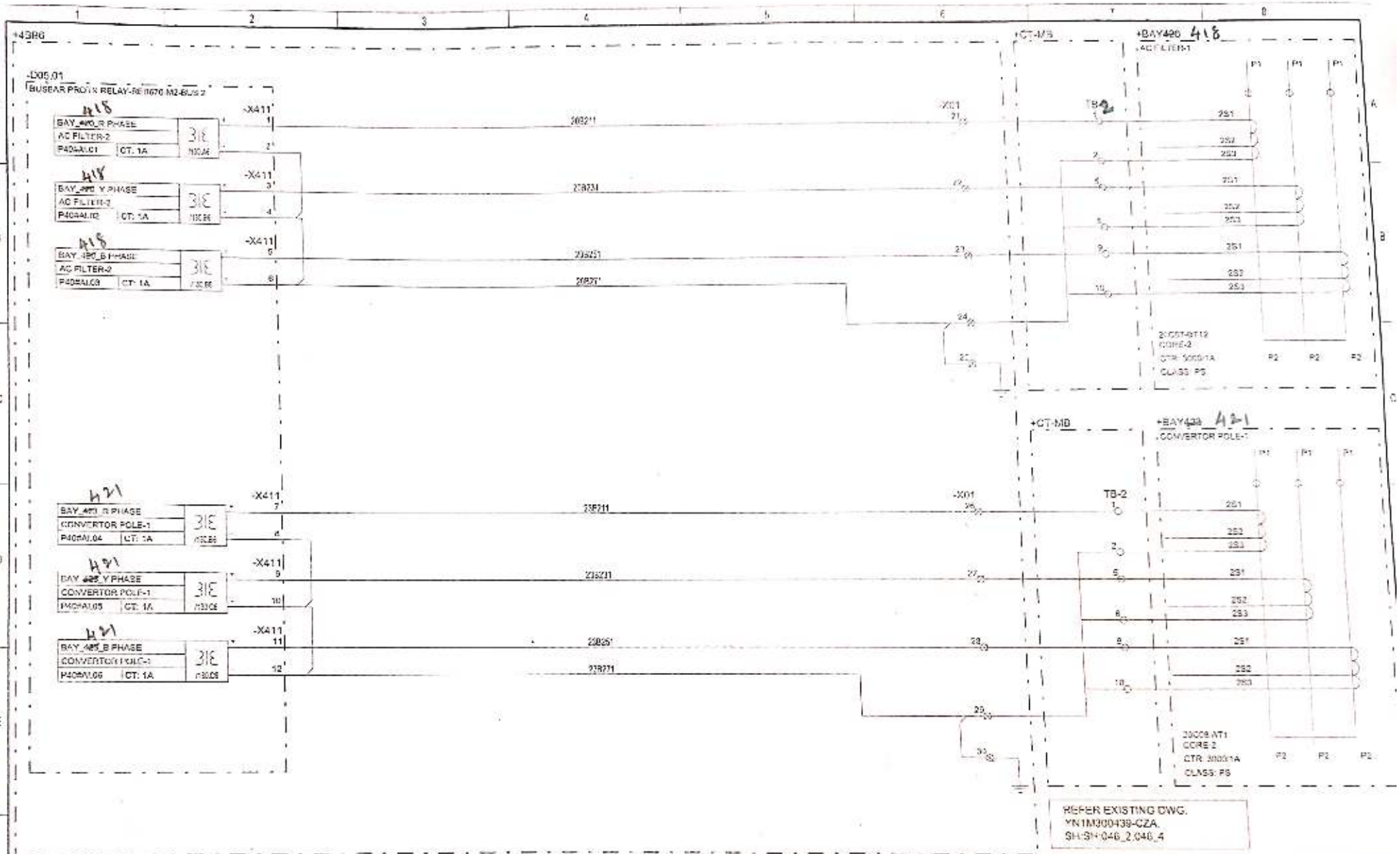
Scanned with OKEN Scanner



Based on: 3100135063	Prepared	18.04.2023	PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind: Circuit diagram	Ref Des.	=4R
	Approved	20.04.2023	DEENADAYALAN A		pcc: EFS		
	Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept: PG-GAS	Rev. ind: 00	Language: en
					Doc. no: 1MNS801837-CGCA	Sheet: 117	
Rev. Revision note	Date	Name				n. sheet: 118	

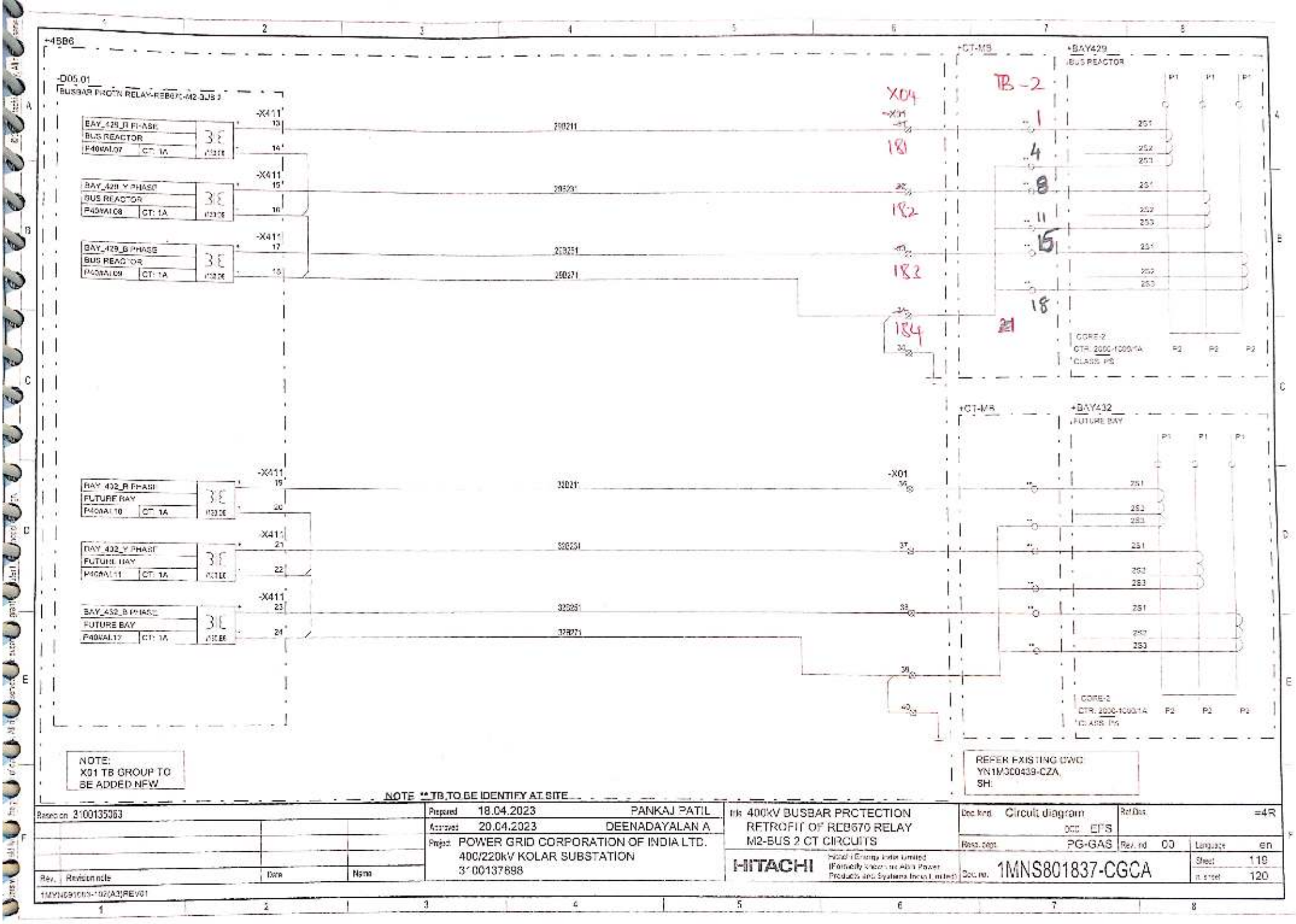
1MVN691003-102(A3)REV01

Scanned with OKEN Scanner



Based on 3100135063			Prepared 18.04.2023	PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	RefDes =4
			Approved 20.04.2023	DEENADAYALAN A		DOC EFS	
			Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind. 00
Rev.	Revision note	Date	Name			Doc. no. 1MNS801837-CGCA	Language e Sheet 118 n. sheet 119
1MYN651003-102(A3)REV01							

Scanned with OKEN Scanner



Reason 2100135063	Prepared 18.04.2023 PANKAJ PATIL	400KV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 CT CIRCUITS	Doc kind Circuit diagram	Ref Doc	=4R
	Approved 20.04.2023 DEENADAYALAN A		DOC CTS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept PG-GAS	Rev. ind 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc no. 1MNS801837-CGCA	Sheet 119	
1MYN091063-192(A3)REV01				n sheet 120	

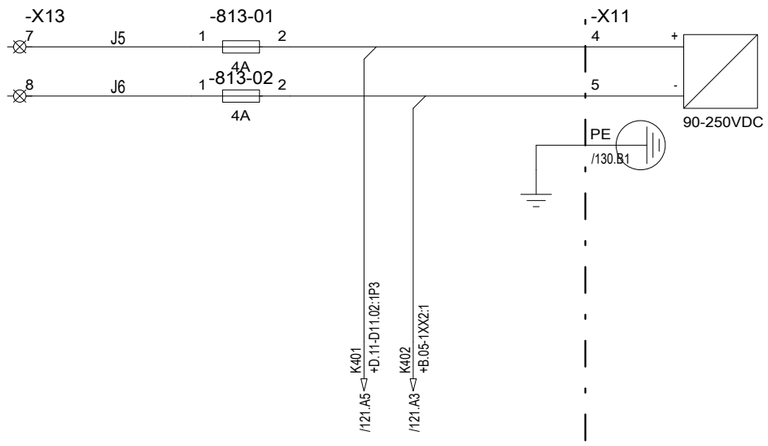
Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB6

FROM SH: 031/4

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2



+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
SFP

-X301

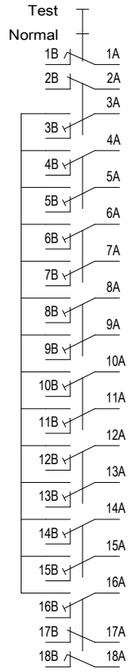
IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

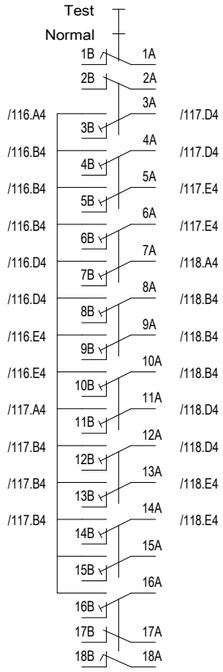
F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 048

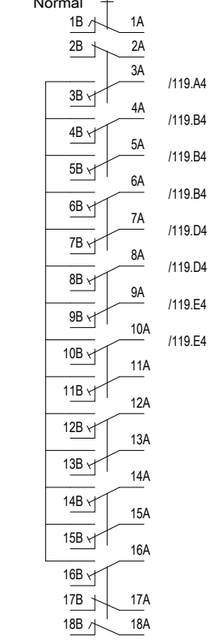
-D21.101.101



-D21.113.101



-D21.125.101



LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 120
n. sheet 121

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

-X31 1	MAIN 2 BUS 2 PROT IN	P3#BI.01	220-250VDC	/131.A2
-X31 2				
-X31 3	MAIN 2 BUS 2 PROT OUT	P3#BI.02	220-250VDC	/131.B2
-X31 4				
-X31 5	SPARE	P3#BI.03	220-250VDC	/131.B2
-X31 6				
-X31 7	TRIP RELAY RESET 96B BUS-2	P3#BI.04	220-250VDC	/131.B2
-X31 8				
-X31 9	SPARE	P3#BI.05	220-250VDC	/131.C2
-X31 10				
-X31 11	SPARE	P3#BI.06	220-250VDC	/131.C2
-X31 12				
-X31 13	SPARE	P3#BI.07	220-250VDC	/131.C2
-X31 14				
-X31 15	REB670 RELAY FAULTY BUS 2 - MAIN 1	P3#BI.08	220-250VDC	/131.D2
-X31 16				

-1XX2 1

+D.05-D05.01:5 (-X11) /120.B2 K402

+D.05-D05.01:4 (-X11) /120.B2 K401

K403 -D11.02 1P4 1P3 /121.B7 IN BB-2 M2 IN/OUT SWITCH

K404 -D11.02 1P2 /121.A7 OUT 1P1 BB-2 M2 IN/OUT SWITCH

K405 -6X04 1

K401 /171.B8

K406 /171.A5 +D.13-D13.101.101:221 -6X04 2

K407 3

K408 4

K409 5

K410 -X14A 3 -X14A 3 4 4

+4BB6

-D11.02
1P2 /121.B4
1P1 C 1P3
1P4 /121.B3
A
2P2
2P1 C 2P3
2P4
A
3P2
3P1 C 3P3
3P4
A
4P2
4P1 C 4P3
4P4
A
IN A
OUT C
BB-2 M2 IN/OUT SWITCH

+4BB2

+D.05 -X11
2
3
1
/58.B2
BUSBAR RELAY FAULTY
BUS-2 MAIN1

NOTE:
6X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

+B.05-1XX2:2 /122.A3 K402

+B.17-X04:13 /122.A5 K401

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

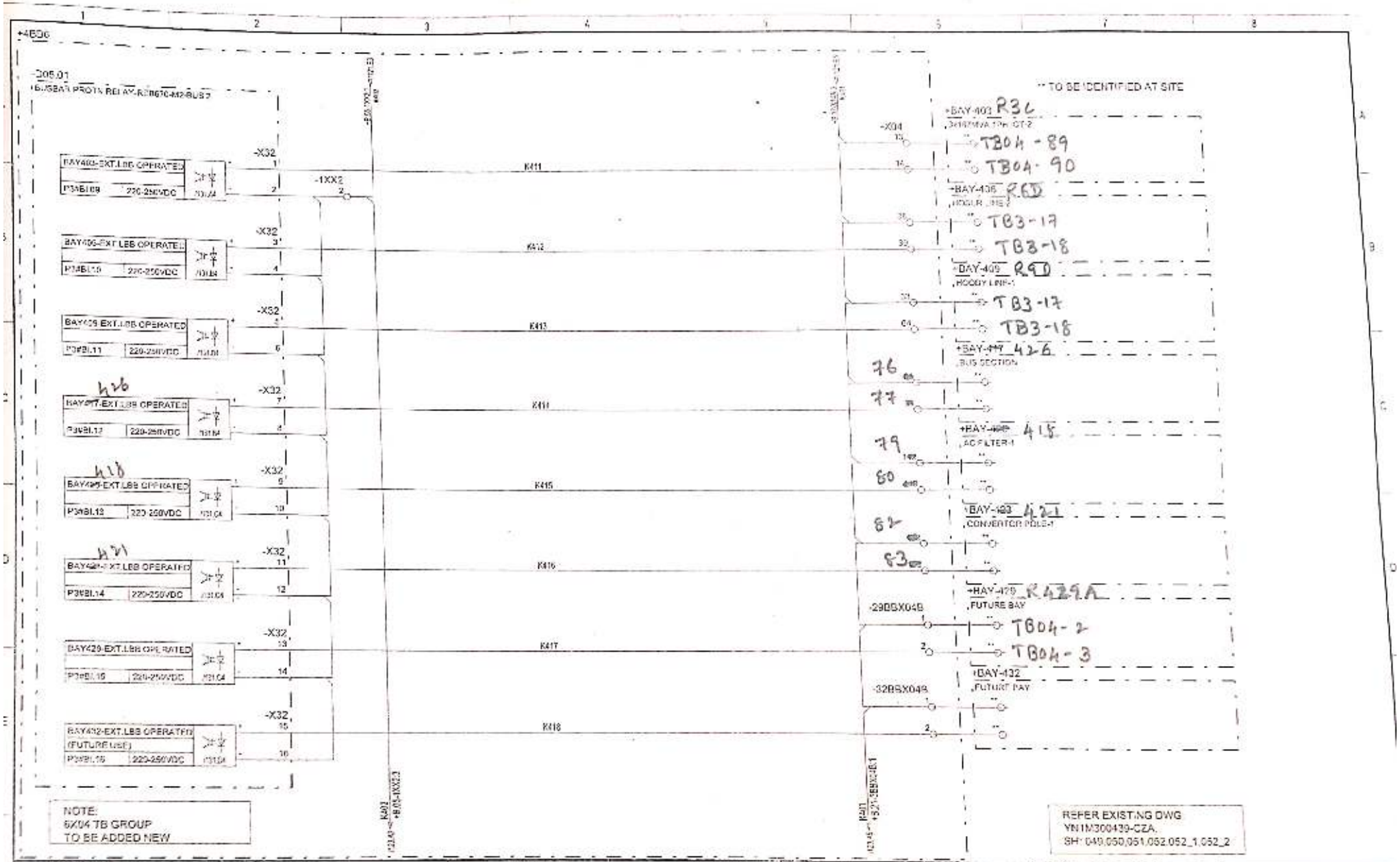
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 121
n. sheet 122
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01



Based on 3100135963	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS	Doc. kind Circuit diagram; 000 EFS; Ref.Des =4R
	Approved 20.04.2023 DEENADAYALAN A		Resp. dept. PG-GAS; Rev. no. 00; Language en
Rev. Revision note / Date / Name	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA; Sheet 122; n. sheet 123

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 /122.E3
+B.05-1XX2:2

K401 /122.E5
+B.33-32BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X51 1(+)	/133.A2
(FUTURE USE)			
P5#BI.01	220-250VDC	2(-)	
SPARE		-X51 3(+)	/133.B2
(FUTURE USE)			
P5#BI.02	220-250VDC	4(-)	
SPARE		-X51 5(+)	/133.B2
(FUTURE USE)			
P5#BI.03	220-250VDC	6(-)	
BAY-403 3PH LBB INIT.		-X51 7(+)	/133.B2
(FUTURE USE)			
P5#BI.04	220-250VDC	8(-)	
BAY-406 RPH LBB INIT.		-X51 9(+)	/133.C2
(FUTURE USE)			
P5#BI.05	220-250VDC	10(-)	
BAY-406 YPH LBB INIT.		-X51 11(+)	/133.C2
(FUTURE USE)			
P5#BI.06	220-250VDC	12(-)	
BAY-406 BPH LBB INIT.		-X51 13(+)	/133.C2
(FUTURE USE)			
P5#BI.07	220-250VDC	14(-)	
BAY-406 3PH LBB INIT.		-X51 15(+)	/133.D2
(FUTURE USE)			
P5#BI.08	220-250VDC	16(-)	

-1XX2 3

K419 K420 K421 K422 K423 K424 K425 K426

-3BBX04B
1 2 3 4 5

+BAY-403
3x167MVA 1PH ICT-2
REF.DRG.NO:####
SHT.NO:##
** ** ** ** ** ** ** **

-6BBX04B
1 2 3 4 5

+BAY-406
HOSUR LINE-2
REF.DRG.NO:####
SHT.NO:##
** ** ** ** ** ** ** **

NOTE:
3BBX04B,6BBX04B TB GROUP
TO BE ADDED NEW

K402 /124.A3
+B.05-1XX2:4

K401 /124.A5
+B.25-9BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 123
n. sheet 124

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 /123.E3
+B.05-1XX2:3

K401 /123.E5
+B.21-6BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-409 RPH LBB INIT.		-X52	+ 1	K427	-1XX2 4
(FUTURE USE)					
P5#BI.09	220-250VDC	/133.A4	- 2		
BAY-409 YPH LBB INIT.		-X52	+ 3	K428	
(FUTURE USE)					
P5#BI.10	220-250VDC	/133.B4	- 4		
BAY-409 BPH LBB INIT.		-X52	+ 5	K429	
(FUTURE USE)					
P5#BI.11	220-250VDC	/133.B4	- 6		
BAY-409 3PH LBB INIT.		-X52	+ 7	K430	
(FUTURE USE)					
P5#BI.12	220-250VDC	/133.B4	- 8		
SPARE		-X52	+ 9	K431	
P5#BI.13	220-250VDC	/133.C4	- 10		
SPARE		-X52	+ 11	K432	
P5#BI.14	220-250VDC	/133.C4	- 12		
SPARE		-X52	+ 13	K433	
P5#BI.15	220-250VDC	/133.C4	- 14		
BAY-417 3PH LBB INIT.		-X52	+ 15	K434	
(FUTURE USE)					
P5#BI.16	220-250VDC	/133.D4	- 16		

-9BBX04B
1 2 3 4 5 **

+BAY-409
HOODY LINE-1
REF.DRG.NO:####
SHT.NO:##

-17BBX04B
1 2 3 4 5 **

+BAY-417
BUS SECTION
REF.DRG.NO:####
SHT.NO:##

NOTE:
9BBX04B,17BBX04B TB GROUP
TO BE ADDED NEW

K402 /125.A3
+B.05-1XX2:5

K401 /125.A5
+B.29-20BBX04B:1

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 124
n. sheet 125

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 /124.E3
+B.05-1XX2:4

K401 /124.E5
+B.25-17BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-420 RPH LBB INIT.		-X71 + 1	K435	-1XX2 5
(FUTURE USE)				
P7#BI.01	220-250VDC	- 2		/133.A6
BAY-420 YPH LBB INIT.		-X71 + 3	K436	
(FUTURE USE)				
P7#BI.02	220-250VDC	- 4		/133.B6
BAY-420 BPH LBB INIT.		-X71 + 5	K437	
(FUTURE USE)				
P7#BI.03	220-250VDC	- 6		/133.B6
BAY-420 3PH LBB INIT.		-X71 + 7	K438	
(FUTURE USE)				
P7#BI.04	220-250VDC	- 8		/133.B6
BAY-423 RPH LBB INIT.		-X71 + 9	K439	
(FUTURE USE)				
P7#BI.05	220-250VDC	- 10		/133.C6
BAY-423 YPH LBB INIT.		-X71 + 11	K440	
(FUTURE USE)				
P7#BI.06	220-250VDC	- 12		/133.C6
BAY-423 BPH LBB INIT.		-X71 + 13	K441	
(FUTURE USE)				
P7#BI.07	220-250VDC	- 14		/133.C6
BAY-423 3PH LBB INIT.		-X71 + 15	K442	
(FUTURE USE)				
P7#BI.08	220-250VDC	- 16		/133.D6

+BAY-420
AC FILTER-1
REF.DRG.NO:####
SHT.NO:##

-20BBX04B
1 **
2 **
3 **
4 **
5 **

+BAY-423
CONVERTOR POLE-1
REF.DRG.NO:####
SHT.NO:##

-23BBX04B
1 **
2 **
3 **
4 **
5 **

NOTE:
20BBX04B,23BBX04B TB GROUP
TO BE ADDED NEW

K402 /126.A3
+B.05-1XX2:6

K401 /126.A5
+B.33-29BBX04B:3

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 125
n. sheet 126

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K402 <I125.E3
+B.05-1XX2:5

K401 <I125.E5
+B.29-23BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-429 RPH LBB INIT.		-X72 + 1	K443
(FUTURE USE)		- 2	-1XX2 6
P7#BI.09	220-250VDC	/133.A7	
BAY-429 YPH LBB INIT.		-X72 + 3	K444
(FUTURE USE)		- 4	
P7#BI.10	220-250VDC	/133.B7	
BAY-429 BPH LBB INIT.		-X72 + 5	K445
(FUTURE USE)		- 6	
P7#BI.11	220-250VDC	/133.B7	
BAY-429 3PH LBB INIT.		-X72 + 7	K446
(FUTURE USE)		- 8	
P7#BI.12	220-250VDC	/133.B7	

-29BBX04B
3 4 5 6 7

+BAY-429
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##
** ** ** ** **

BAY-432 RPH LBB INIT.		-X72 + 9	K447
(FUTURE USE)		- 10	
P7#BI.13	220-250VDC	/133.C7	
BAY-432 YPH LBB INIT.		-X72 + 11	K448
(FUTURE USE)		- 12	
P7#BI.14	220-250VDC	/133.C7	
BAY-432 BPH LBB INIT.		-X72 + 13	K449
(FUTURE USE)		- 14	
P7#BI.15	220-250VDC	/133.C7	
BAY-432 3PH LBB INIT.		-X72 + 15	K450
(FUTURE USE)		- 16	
P7#BI.16	220-250VDC	/133.D7	

-32BBX04B
3 4 5 6 7

+BAY-432
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##
** ** ** ** **

NOTE:
29BBX04B,32BBX04B TB GROUP
TO BE ADDED NEW

K402 /128.A5 <I +B.17-X04:154

K401 /128.A5 <I +D.05-D05.01:2 (-X41)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

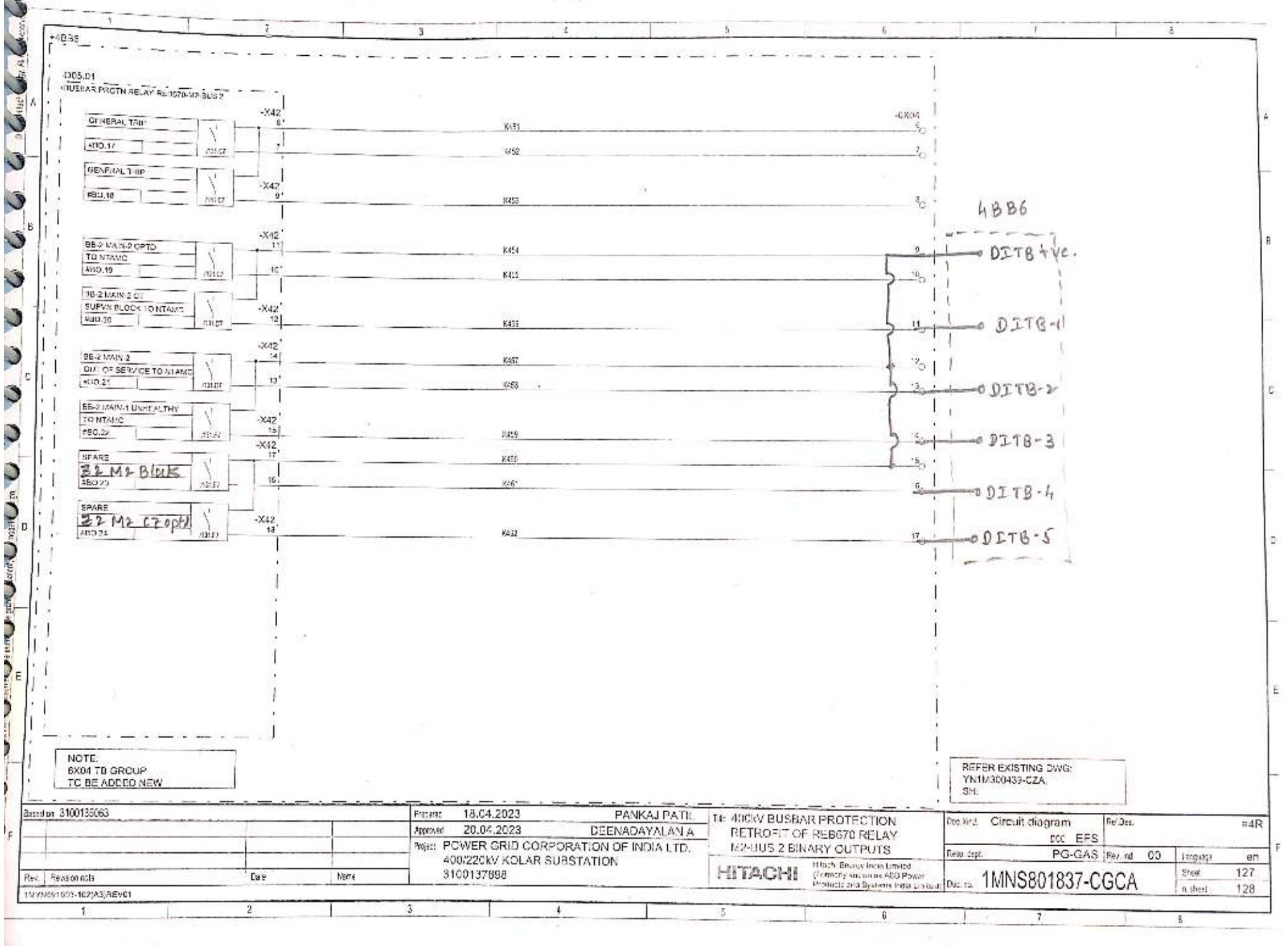
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY INPUTS

HITACHI Hitachi Energy India Limited

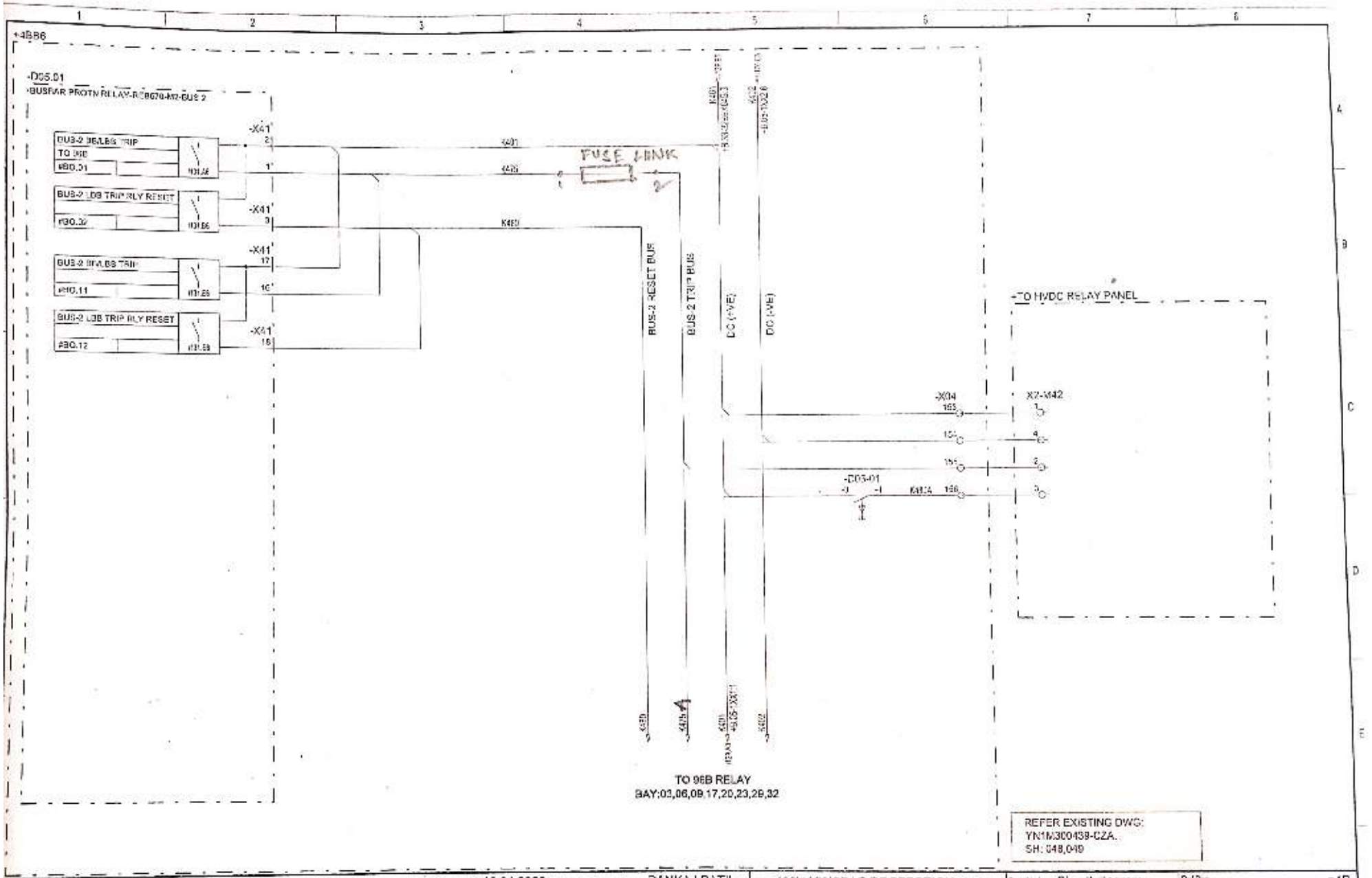
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 126
n. sheet 127

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Scanned with OKEN Scanner



Based on 3100135063	Prepared 18.04.2023 PANKAJ PATIL	Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY OUTPUTS	Doc kind. Circuit diagram	Ref Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A		DOC EFS		
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Reas cep. PG-GAS	Rev. ind. 00	Language en
Rev. Revision note / Date / Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 128	n sheet 129

1MYN801039-1C2/ASI/REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K401 /128.E5
-D05-01:-3

BAY-403 LBB RETRIP-M2	#BO.03	/131.B6	-X41 5 4	6P13 19
BAY-406 RPH LBB RETRIP-M2	#BO.04	/131.C6	-X41 6	6P15 20
BAY-406 YPH LBB RETRIP-M2	#BO.05	/131.C6	-X41 8 7	6P17 21
BAY-406 BPH LBB RETRIP-M2	#BO.06	/131.C6	-X41 9	6P19 22
BAY-409 RPH LBB RETRIP-M2	#BO.07	/131.C6	-X41 11 10	6P21 23
BAY-409 YPH LBB RETRIP-M2	#BO.08	/131.D6	-X41 12	6P23 24
BAY-409 BPH LBB RETRIP-M2	#BO.09	/131.D6	-X41 14 13	6P25 25
BAY-417 LBB RETRIP-M2	#BO.10	/131.E6	-X41 15	6P27 26

-1XX1 1
-1XX1 2

-6X04

NOTE:
1XX1, 6X04 TB GROUP
TO BE ADDED NEW

K401 /129.A7
+B.05-1XX1:3

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

K401 /129.E3
+B.05-1XX1:2

BAY-420 RPH LBB RETRIP-M2	#BO.01	/132.A2	-X61 2 1	6P29 27
BAY-420 YPH LBB RETRIP-M2	#BO.02	/132.B2	-X61 3	6P31 28
BAY-420 BPH LBB RETRIP-M2	#BO.03	/132.B2	-X61 5 4	6P33 29
BAY-423 RPH LBB RETRIP-M2	#BO.04	/132.C2	-X61 6	6P35 30
BAY-423 YPH LBB RETRIP-M2	#BO.05	/132.C2	-X61 8 7	6P37 31
BAY-423 BPH LBB RETRIP-M2	#BO.06	/132.C2	-X61 9	6P39 32
BAY-429 RPH LBB RETRIP-M2	#BO.07	/132.C2	-X61 11 10	6P41 33
BAY-429 YPH LBB RETRIP-M2	#BO.08	/132.D2	-X61 12	6P43 34
BAY-429 BPH LBB RETRIP-M2	#BO.09	/132.D2	-X61 14 13	6P45 35
BAY-432 RPH LBB RETRIP-M2	#BO.10	/132.E2	-X61 15	6P47 36
BAY-432 YPH LBB RETRIP-M2	#BO.11	/132.E2	-X61 17 16	6P49 37
BAY-432 BPH LBB RETRIP-M2	#BO.12	/132.E2	-X61 18	6P51 38

-1XX1 3
-1XX1 4
-1XX1 5

-6X04

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 129
n. sheet 130

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
PSM
90-250VDC

-X11

4 +
5 -
/120.B3
90-250VDC
PE

-X11
2
3 /49.E7
1

BB RELAY FAULTY	
BUS-2 MAIN-2	

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
TRM
1A, 50/60Hz

-X401

BAY_403_R PHASE	+ 1			
400/220/33kV ICT-2			- 2	/116.A2
P40#AI.01 CT: 1A				
BAY_403_Y PHASE	+ 3			
400/220/33kV ICT-2			- 4	/116.B2
P40#AI.02 CT: 1A				
BAY_403_B PHASE	+ 5			
400/220/33kV ICT-2			- 6	/116.B2
P40#AI.03 CT: 1A				
BAY_406_R PHASE	+ 7			
HOSUR LINE-2			- 8	/116.D2
P40#AI.04 CT: 1A				
BAY_406_Y PHASE	+ 9			
HOSUR LINE-2			- 10	/116.D2
P40#AI.05 CT: 1A				
BAY_406_B PHASE	+ 11			
HOSUR LINE-2			- 12	/116.E2
P40#AI.06 CT: 1A				
BAY_409_R PHASE	+ 13			
HOODY LINE-1			- 14	/117.A2
P40#AI.07 CT: 1A				
BAY_409_Y PHASE	+ 15			
HOODY LINE-1			- 16	/117.B2
P40#AI.08 CT: 1A				
BAY_409_B PHASE	+ 17			
HOODY LINE-1			- 18	/117.B2
P40#AI.09 CT: 1A				
BAY_417_R PHASE	+ 19			
BUS SECTION			- 20	/117.D2
P40#AI.10 CT: 1A				
BAY_417_Y PHASE	+ 21			
BUS SECTION			- 22	/117.D2
P40#AI.11 CT: 1A				
BAY_417_B PHASE	+ 23			
BUS SECTION			- 24	/117.E2
P40#AI.12 CT: 1A				

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
TRM
1A, 50/60Hz

-X411

BAY_420_R PHASE	+ 1			
AC FILTER-2			- 2	/118.A2
P40#AI.01 CT: 1A				
BAY_420_Y PHASE	+ 3			
AC FILTER-2			- 4	/118.B2
P40#AI.02 CT: 1A				
BAY_420_B PHASE	+ 5			
AC FILTER-2			- 6	/118.B2
P40#AI.03 CT: 1A				
BAY_423_R PHASE	+ 7			
CONVERTOR POLE-1			- 8	/118.D2
P40#AI.04 CT: 1A				
BAY_423_Y PHASE	+ 9			
CONVERTOR POLE-1			- 10	/118.D2
P40#AI.05 CT: 1A				
BAY_423_B PHASE	+ 11			
CONVERTOR POLE-1			- 12	/118.E2
P40#AI.06 CT: 1A				
BAY_429_R PHASE	+ 13			
BUS REACTOR			- 14	/119.A2
P40#AI.07 CT: 1A				
BAY_429_Y PHASE	+ 15			
BUS REACTOR			- 16	/119.B2
P40#AI.08 CT: 1A				
BAY_429_B PHASE	+ 17			
BUS REACTOR			- 18	/119.B2
P40#AI.09 CT: 1A				
BAY_432_R PHASE	+ 19			
FUTURE BAY			- 20	/119.D2
P40#AI.10 CT: 1A				
BAY_432_Y PHASE	+ 21			
FUTURE BAY			- 22	/119.D2
P40#AI.11 CT: 1A				
BAY_432_B PHASE	+ 23			
FUTURE BAY			- 24	/119.E2
P40#AI.12 CT: 1A				

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 130
n. sheet 131

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X31

MAIN 2 BUS 2 PROT IN	P3#BI.01	220-250VDC	+ 1 / - 2	/121.B2
MAIN 2 BUS 2 PROT OUT	P3#BI.02	220-250VDC	+ 3 / - 4	/121.B2
SPARE	P3#BI.03	220-250VDC	+ 5 / - 6	/121.C2
TRIP RELAY RESET 96B BUS-2	P3#BI.04	220-250VDC	+ 7 / - 8	/121.C2
SPARE	P3#BI.05	220-250VDC	+ 9 / - 10	/121.C2
SPARE	P3#BI.06	220-250VDC	+ 11 / - 12	/121.D2
SPARE	P3#BI.07	220-250VDC	+ 13 / - 14	/121.D2
REB670 RELAY FAULTY BUS 2 - MAIN 1	P3#BI.08	220-250VDC	+ 15 / - 16	/121.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X32

BAY403-EXT.LBB OPERATED	P3#BI.09	220-250VDC	+ 1 / - 2	/122.B2
BAY406-EXT.LBB OPERATED	P3#BI.10	220-250VDC	+ 3 / - 4	/122.B2
BAY409-EXT.LBB OPERATED	P3#BI.11	220-250VDC	+ 5 / - 6	/122.C2
BAY417-EXT.LBB OPERATED	P3#BI.12	220-250VDC	+ 7 / - 8	/122.C2
BAY420-EXT.LBB OPERATED	P3#BI.13	220-250VDC	+ 9 / - 10	/122.D2
BAY423-EXT.LBB OPERATED	P3#BI.14	220-250VDC	+ 11 / - 12	/122.D2
BAY429-EXT.LBB OPERATED	P3#BI.15	220-250VDC	+ 13 / - 14	/122.E2
BAY432-EXT.LBB OPERATED (FUTURE USE)	P3#BI.16	220-250VDC	+ 15 / - 16	/122.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

-X41

BUS-2 BB/LBB TRIP TO 96B	#BO.01	2 / 1	/128.B2
BUS-2 LBB TRIP RLY RESET	#BO.02	3	/128.B2
BAY-403 LBB RETRIP-M2	#BO.03	5 / 4	/129.B2
BAY-406 RPH LBB RETRIP-M2	#BO.04	6	/129.B2
BAY-406 YPH LBB RETRIP-M2	#BO.05	8 / 7	/129.B2
BAY-406 BPH LBB RETRIP-M2	#BO.06	9	/129.C2
BAY-409 RPH LBB RETRIP-M2	#BO.07	11 / 10	/129.C2
BAY-409 YPH LBB RETRIP-M2	#BO.08	12	/129.C2
BAY-409 BPH LBB RETRIP-M2	#BO.09	14 / 13	/129.D2
BAY-417 LBB RETRIP-M2	#BO.10	15	/129.D2
BUS-2 BB/LBB TRIP	#BO.11	17 / 16	/128.B2
BUS-2 LBB TRIP RLY RESET	#BO.12	18	/128.C2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

-X42

BUSBAR-2 OPTD ANNUNCIATION CKT	#BO.13	2 / 1	/173.A3
BB-2 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.B3
BUSBAR-2 Rph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.A6
BUSBAR-2 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.B6
GENERAL TRIP	#BO.17	8 / 7	/127.A2
GENERAL TRIP	#BO.18	9	/127.B2
BB-2 MAIN-2 OPTD TO NTAMC	#BO.19	11 / 10	/127.B2
BB-2 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/127.C2
BB-2 MAIN-2 OUT OF SERVICE TO NTAMC	#BO.21	14 / 13	/127.C2
BB-2 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/127.C2
SPARE	#BO.23	17 / 16	/127.D2
SPARE	#BO.24	18	/127.D2

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Resp. dept. PG-GAS
Doc. no. 1MNS801837-CGCA

Ref.Des. =4R
Rev. ind. 01
Language en
Sheet 131
n. sheet 132

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

-X61

BAY-420 RPH LBB RETRIP-M2	#BO.01	2 / 1	/129.B6
BAY-420 YPH LBB RETRIP-M2	#BO.02	3	/129.B6
BAY-420 BPH LBB RETRIP-M2	#BO.03	5 / 4	/129.B6
BAY-423 RPH LBB RETRIP-M2	#BO.04	6	/129.C6
BAY-423 YPH LBB RETRIP-M2	#BO.05	8 / 7	/129.C6
BAY-423 BPH LBB RETRIP-M2	#BO.06	9	/129.C6
BAY-429 RPH LBB RETRIP-M2	#BO.07	11 / 10	/129.D6
BAY-429 YPH LBB RETRIP-M2	#BO.08	12	/129.D6
BAY-429 BPH LBB RETRIP-M2	#BO.09	14 / 13	/129.D6
BAY-432 RPH LBB RETRIP-M2	#BO.10	15	/129.E6
BAY-432 YPH LBB RETRIP-M2	#BO.11	17 / 16	/129.E6
BAY-432 BPH LBB RETRIP-M2	#BO.12	18	/129.E6

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 2
BOM

X62

BUSBAR-2 Bph OPTD EVENT LOGGER CKT	#BO.13	2 / 1	/175.B6
BB-2 CT SUPVN EVENT LOGGER CKT	#BO.14	3	/175.B6
SPARE	#BO.15	5 / 4	
SPARE	#BO.16	6	
SPARE	#BO.17	8 / 7	
SPARE	#BO.18	9	
SPARE	#BO.19	11 / 10	
SPARE	#BO.20	12	
SPARE	#BO.21	14 / 13	
SPARE	#BO.22	15	
SPARE	#BO.23	17 / 16	
SPARE	#BO.24	18	

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 132
n. sheet 133

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB6

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X51

SPARE (FUTURE USE) P5#BI.01 220-250VDC	+ 1	- 2	/123.B2
SPARE (FUTURE USE) P5#BI.02 220-250VDC	+ 3	- 4	/123.B2
SPARE (FUTURE USE) P5#BI.03 220-250VDC	+ 5	- 6	/123.C2
BAY-403 3PH LBB INIT. (FUTURE USE) P5#BI.04 220-250VDC	+ 7	- 8	/123.C2
BAY-406 RPH LBB INIT. (FUTURE USE) P5#BI.05 220-250VDC	+ 9	- 10	/123.D2
BAY-406 YPH LBB INIT. (FUTURE USE) P5#BI.06 220-250VDC	+ 11	- 12	/123.D2
BAY-406 BPH LBB INIT. (FUTURE USE) P5#BI.07 220-250VDC	+ 13	- 14	/123.E2
BAY-406 3PH LBB INIT. (FUTURE USE) P5#BI.08 220-250VDC	+ 15	- 16	/123.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X52

BAY-409 RPH LBB INIT. (FUTURE USE) P5#BI.09 220-250VDC	+ 1	- 2	/124.B2
BAY-409 YPH LBB INIT. (FUTURE USE) P5#BI.10 220-250VDC	+ 3	- 4	/124.B2
BAY-409 BPH LBB INIT. (FUTURE USE) P5#BI.11 220-250VDC	+ 5	- 6	/124.C2
BAY-409 3PH LBB INIT. (FUTURE USE) P5#BI.12 220-250VDC	+ 7	- 8	/124.C2
SPARE P5#BI.13 220-250VDC	+ 9	- 10	/124.D2
SPARE P5#BI.14 220-250VDC	+ 11	- 12	/124.D2
SPARE P5#BI.15 220-250VDC	+ 13	- 14	/124.E2
BAY-417 3PH LBB INIT. (FUTURE USE) P5#BI.16 220-250VDC	+ 15	- 16	/124.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X71

BAY-420 RPH LBB INIT. (FUTURE USE) P7#BI.01 220-250VDC	+ 1	- 2	/125.B2
BAY-420 YPH LBB INIT. (FUTURE USE) P7#BI.02 220-250VDC	+ 3	- 4	/125.B2
BAY-420 BPH LBB INIT. (FUTURE USE) P7#BI.03 220-250VDC	+ 5	- 6	/125.C2
BAY-420 3PH LBB INIT. (FUTURE USE) P7#BI.04 220-250VDC	+ 7	- 8	/125.C2
BAY-423 RPH LBB INIT. (FUTURE USE) P7#BI.05 220-250VDC	+ 9	- 10	/125.D2
BAY-423 YPH LBB INIT. (FUTURE USE) P7#BI.06 220-250VDC	+ 11	- 12	/125.D2
BAY-423 BPH LBB INIT. (FUTURE USE) P7#BI.07 220-250VDC	+ 13	- 14	/125.E2
BAY-423 3PH LBB INIT. (FUTURE USE) P7#BI.08 220-250VDC	+ 15	- 16	/125.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2
BIM
220-250VDC

-X72

BAY-429 RPH LBB INIT. (FUTURE USE) P7#BI.09 220-250VDC	+ 1	- 2	/126.B2
BAY-429 YPH LBB INIT. (FUTURE USE) P7#BI.10 220-250VDC	+ 3	- 4	/126.B2
BAY-429 BPH LBB INIT. (FUTURE USE) P7#BI.11 220-250VDC	+ 5	- 6	/126.C2
BAY-429 3PH LBB INIT. (FUTURE USE) P7#BI.12 220-250VDC	+ 7	- 8	/126.C2
BAY-432 RPH LBB INIT. (FUTURE USE) P7#BI.13 220-250VDC	+ 9	- 10	/126.D2
BAY-432 YPH LBB INIT. (FUTURE USE) P7#BI.14 220-250VDC	+ 11	- 12	/126.D2
BAY-432 BPH LBB INIT. (FUTURE USE) P7#BI.15 220-250VDC	+ 13	- 14	/126.E2
BAY-432 3PH LBB INIT. (FUTURE USE) P7#BI.16 220-250VDC	+ 15	- 16	/126.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

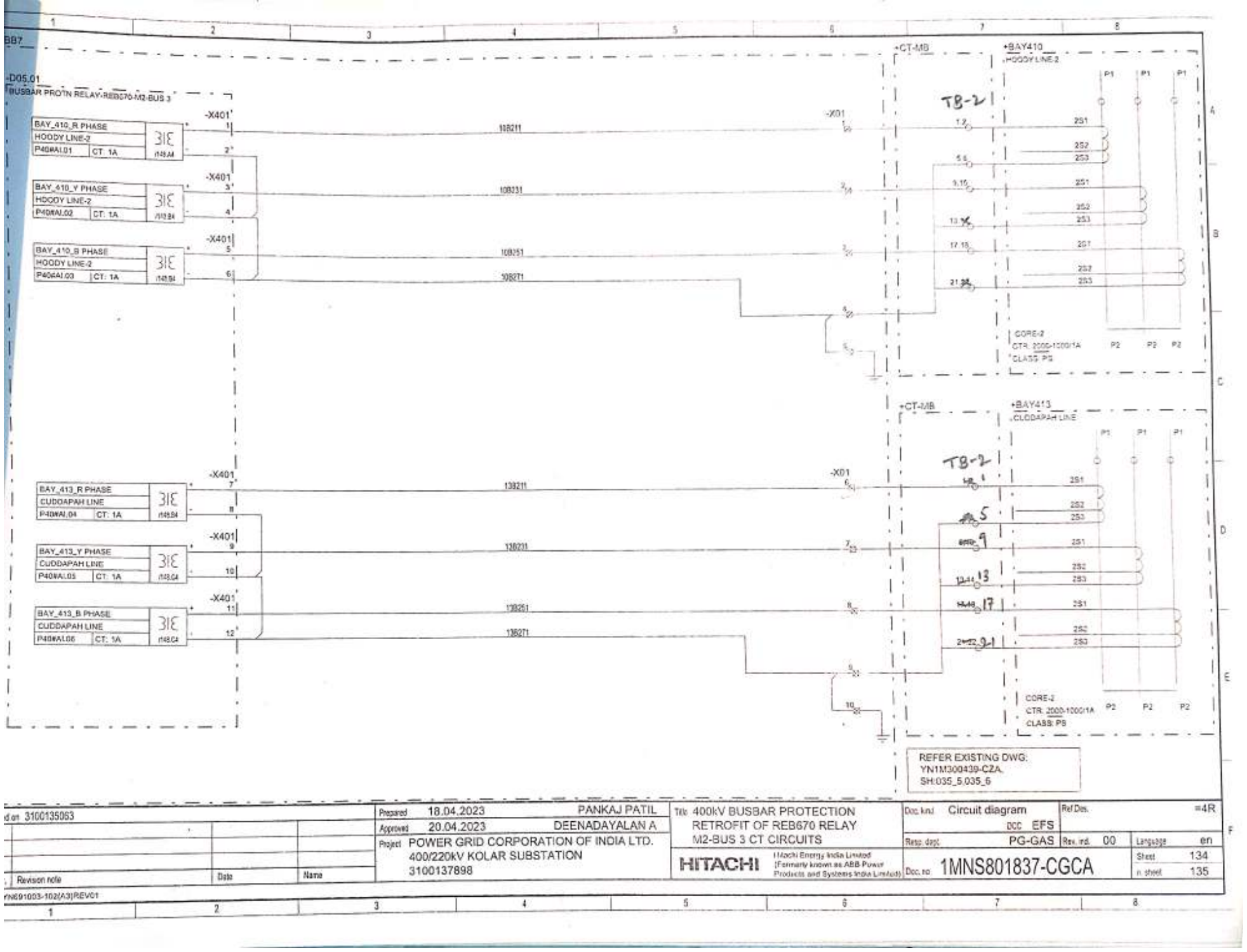
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 2 OVERVIEW

HITACHI Hitachi Energy India Limited

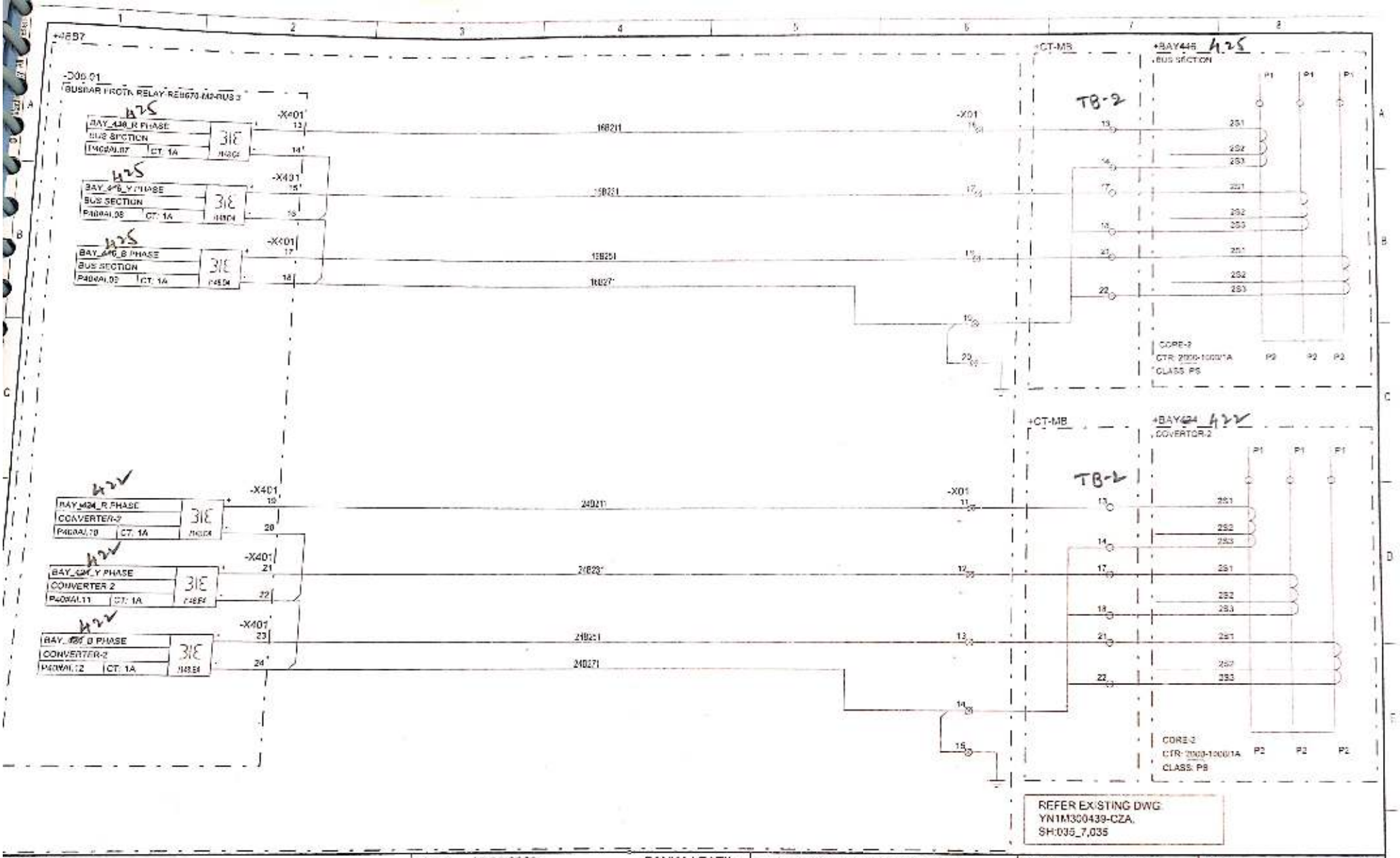
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 133
n. sheet 134

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Scanned with OKEN Scanner



3100135363			Prepared	18.04.2023	PANKAJ PATIL	Doc. kind: Circuit diagram	Ref.Des. =4R
			Approved	20.04.2023	DEENADAYALAN A	DOC EFS	
			Project:	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept. PG-GAS	Rev. ind. 00 Language en
Revision note	Date	Name				Doc. no. 1MNS801837-CGCA	Sheet 135 n. sheet 136

Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 CT CIRCUITS

HITACHI — Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)

003-102(A3)/REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY_433_R PHASE			
FUTURE BAY			
P40#AI.01	CT: 1A		/148.A6

BAY_433_Y PHASE			
FUTURE BAY			
P40#AI.02	CT: 1A		/148.B6

BAY_433_B PHASE			
FUTURE BAY			
P40#AI.03	CT: 1A		/148.B6

-X401: + 1, - 2 | 33B212
-X401: + 3, - 4 | 33B232
-X401: + 5, - 6 | 33B252 | 33B272

-D21.113.101
7A 33B211 /138.B8 — 7B
8A 33B231 /138.B8 — 8B
9A 33B251 /138.B8 — 9B
10A 33B271 /138.B8 — 10B

** -X01
21, 22, 23, 24, 25

+CT-MB

+BAY433
FUTURE BAY
P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

+CT-MB

+BAY436
FUTURE BAY
P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

BAY_436_R PHASE			
FUTURE BAY			
P40#AI.04	CT: 1A		/148.B6

BAY_436_Y PHASE			
FUTURE BAY			
P40#AI.05	CT: 1A		/148.C6

BAY_436_B PHASE			
FUTURE BAY			
P40#AI.06	CT: 1A		/148.C6

-X401: + 7, - 8 | 36B212
-X401: + 9, - 10 | 36B232
-X401: + 11, - 12 | 36B252 | 36B272

-D21.113.101
11A 36B211 /138.B8 — 11B
12A 36B231 /138.B8 — 12B
13A 36B251 /138.C8 — 13B
14A 36B271 /138.C8 — 14B

** -X01
26, 27, 28, 29, 30

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 3 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 136
n. sheet 137

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY_439_R PHASE			
FUTURE BAY			
P40#AI.07	CT: 1A		/148.C6

BAY_439_Y PHASE			
FUTURE BAY			
P40#AI.08	CT: 1A		/148.D6

BAY_439_B PHASE			
FUTURE BAY			
P40#AI.09	CT: 1A		/148.D6

-X401: + 13, - 14 | 39B212 | -D21.125.101: 3B, 3A /138.D8 | 39B211 | **-X01: 31
-X401: + 15, - 16 | 39B232 | 4B, 4A /138.D8 | 39B231 | 32
-X401: + 17, - 18 | 39B252 | 5B, 5A /138.D8 | 39B251 | 33
39B272 | 6B, 6A /138.D8 | 39B271 | 34
35

+CT-MB

+BAY439
FUTURE BAY

P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
P2 P2 P2

CORE-2
CTR: 2000-1000/1A
CLASS: PS

BAY_442_R PHASE			
FUTURE BAY			
P40#AI.10	CT: 1A		/148.D6

BAY_442_Y PHASE			
FUTURE BAY			
P40#AI.11	CT: 1A		/148.E6

BAY_442_B PHASE			
FUTURE BAY			
P40#AI.12	CT: 1A		/148.E6

-X401: + 19, - 20 | 42B212 | -D21.125.101: 7B, 7A /138.D8 | 42B211 | ** -X01: 36
-X401: + 21, - 22 | 42B232 | 8B, 8A /138.D8 | 42B231 | 37
-X401: + 23, - 24 | 42B252 | 9B, 9A /138.D8 | 42B251 | 38
42B272 | 10B, 10A /138.E8 | 42B271 | 39
40

+CT-MB

+BAY442
FUTURE BAY

P1 P1 P1
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
1S1 1S2 1S3 (**)
P2 P2 P2

CORE-2
CTR: 2000-1000/1A
CLASS: PS

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 137
n. sheet 138

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB7

FROM SH: 031/2

-X13 -B13-01 -B13-02

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

PSM
-X11

90-250VDC

PE
/148.B1

K601 +D.23-D23.02:1P3
/139.A5

K602 +B.09-1XX2:1
/139.A3

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

-D21.101.101
Test
Normal

1B	1A	
2B	2A	
3B	3A	/134.A4
4B	4A	/134.B4
5B	5A	/134.B4
6B	6A	/134.B4
7B	7A	/134.D4
8B	8A	/134.D4
9B	9A	/134.E4
10B	10A	/134.E4
11B	11A	/135.A4
12B	12A	/135.B4
13B	13A	/135.B4
14B	14A	/135.B4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.113.101
Test
Normal

1B	1A	
2B	2A	
3B	3A	/135.D4
4B	4A	/135.D4
5B	5A	/135.E4
6B	6A	/135.E4
7B	7A	/136.A4
8B	8A	/136.B4
9B	9A	/136.B4
10B	10A	/136.B4
11B	11A	/136.D4
12B	12A	/136.D4
13B	13A	/136.E4
14B	14A	/136.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.125.101
Test
Normal

1B	1A	
2B	2A	
3B	3A	/137.A4
4B	4A	/137.B4
5B	5A	/137.B4
6B	6A	/137.B4
7B	7A	/137.D4
8B	8A	/137.D4
9B	9A	/137.E4
10B	10A	/137.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 037

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 138
n. sheet 139

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

+D.05-D05.01:5 (-X11) /138.B2 K602

+D.05-D05.01:4 (-X11) /138.B2 K601

-X31 1	MAIN 2 BUS 3PROT IN	P3#BI.01	220-250VDC	/149.A2	-1XX2 1
-X31 3	MAIN 2 BUS 3 PROT OUT	P3#BI.02	220-250VDC	/149.B2	
-X31 5	SPARE	P3#BI.03	220-250VDC	/149.B2	
-X31 7	TRIP RELAY RESET 96B BUS -3	P3#BI.04	220-250VDC	/149.B2	
-X31 9	SPARE	P3#BI.05	220-250VDC	/149.C2	
-X31 11	SPARE	P3#BI.06	220-250VDC	/149.C2	
-X31 13	SPARE	P3#BI.07	220-250VDC	/149.C2	
-X31 15	REB670 RELAY FAULTY BUS 3 - MAIN 1	P3#BI.08	220-250VDC	/149.D2	

-D23.02
1P3 — 1P4 — K603 — /139.B7 IN — BB-3 M2 IN/OUT SWITCH

-D23.02
1P2 — /139.A7 OUT — 1P1 — K604 — BB-3 M2 IN/OUT SWITCH

K605 → -7X04 2

K601 → /171.E4

K606 → /171.D1 → +D.13-D13.101.101:221

-7X04 3

K607 → 4

K608 → 5

K609 → 6

K610 → -X14A 3 / -X14A 4

-D23.02
1P2 /139.B4, 1P1 C, 1P3 1P4 /139.B3 A
2P2 2P1 C, 2P3 2P4 A
3P2 3P1 C, 3P3 3P4 A
4P2 4P1 C, 4P3 4P4 A
IN A, OUT C
BB-3 M2 IN/OUT SWITCH

+4BB3

+D.05
-X14A 3 — -X14A 3 — -X11 2
4 — 3
1
/76.B2
BUSBAR RELAY FAULTY
BUS-3 MAIN-1

NOTE:
7X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

+B.09-1XX2:2 /140.A3 K602

+B.33-X04:13 /140.A5 K601

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

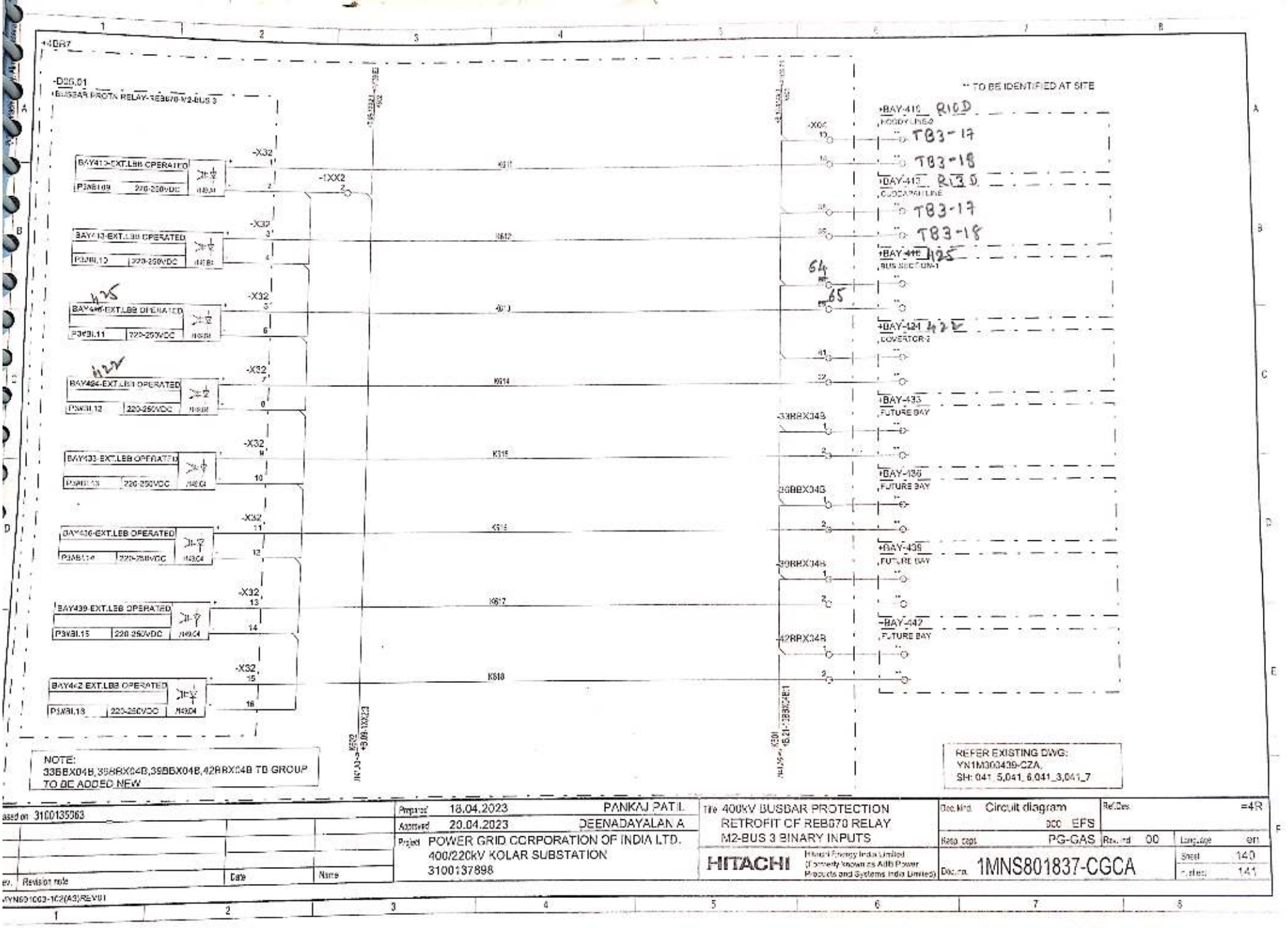
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 139
n. sheet 140

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Prepared	18.04.2023	PANKAJ PATIL	The 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS	Doc.kind Circuit diagram	Ref.Des =4R
Approved	20.04.2023	DEENADAYALAN A		doc EFS	
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Resp.dept PG-GAS	Rev.ind 00 Language en
				Doc.no 1MNS801837-CGCA	Sheet 140 Sheets 141

based on 3100135063

Rev.	Revision note	Date	Name

YN601003-1C2(AS)REV01

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /140.E3
+B.09-1XX2:2

K601 /140.E5
+B.33-42BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-410
HOODY LINE-2
REF.DRG.NO:####
SHT.NO:##

-10BBX04B

+BAY-413
CUDDAPAH LINE
REF.DRG.NO:####
SHT.NO:##

-13BBX04B

BAY-410 RPH LBB INIT.		-X51 + 1	K619	-1XX2 3	1 2 ** **
(FUTURE USE)					
P5#BI.01	220-250VDC	- 2 /151.A2			
BAY-410 YPH LBB INIT.		-X51 + 3	K620		3 **
(FUTURE USE)					
P5#BI.02	220-250VDC	- 4 /151.B2			
BAY-410 BPH LBB INIT.		-X51 + 5	K621		4 **
(FUTURE USE)					
P5#BI.03	220-250VDC	- 6 /151.B2			
BAY-410 3PH LBB INIT.		-X51 + 7	K622		5 **
(FUTURE USE)					
P5#BI.04	220-250VDC	- 8 /151.B2			
BAY-413 RPH LBB INIT.		-X51 + 9	K623		1 **
(FUTURE USE)					
P5#BI.05	220-250VDC	- 10 /151.C2			2 **
BAY-413 YPH LBB INIT.		-X51 + 11	K624		3 **
(FUTURE USE)					
P5#BI.06	220-250VDC	- 12 /151.C2			
BAY-413 BPH LBB INIT.		-X51 + 13	K625		4 **
(FUTURE USE)					
P5#BI.07	220-250VDC	- 14 /151.C2			
BAY-413 3PH LBB INIT.		-X51 + 15	K626		5 **
(FUTURE USE)					
P5#BI.08	220-250VDC	- 16 /151.D2			

K602 /142.A3
+B.09-1XX2:4

K601 /142.A6
+B.25-16BBX04B:1

NOTE:
10BBX04B,13BBX04B TB GROUP TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 141
n. sheet 142

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /141.E3
+B.09-1XX2:3

K601 /141.E6
+B.21-13BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-416
BUS SECTION-1
REF.DRG.NO:####
SHT.NO:##

-16BBX04B

+BAY-424
COVERTOR-2
REF.DRG.NO:####
SHT.NO:##

-24BBX04B

SPARE	-X52 + 1	K627	-1XX2 4	-16BBX04B 1	**
(FUTURE USE)	- 2			2	**
P5#BI.09 220-250VDC /151.A4					
SPARE	-X52 + 3	K628		3	**
(FUTURE USE)	- 4				
P5#BI.10 220-250VDC /151.B4					
SPARE	-X52 + 5	K629		4	**
(FUTURE USE)	- 6				
P5#BI.11 220-250VDC /151.B4					
BAY-416 3PH LBB INIT.	-X52 + 7	K630		5	**
(FUTURE USE)	- 8				
P5#BI.12 220-250VDC /151.B4					
BAY-424 RPH LBB INIT.	-X52 + 9	K631		-24BBX04B 1	**
(FUTURE USE)	- 10			2	**
P5#BI.13 220-250VDC /151.C4					
BAY-424 YPH LBB INIT.	-X52 + 11	K632		3	**
(FUTURE USE)	- 12				
P5#BI.14 220-250VDC /151.C4					
BAY-424 BPH LBB INIT.	-X52 + 13	K633		4	**
(FUTURE USE)	- 14				
P5#BI.15 220-250VDC /151.C4					
BAY-424 3PH LBB INIT.	-X52 + 15	K634		5	**
(FUTURE USE)	- 16				
P5#BI.16 220-250VDC /151.D4					

K602 /143.A3 +B.09-1XX2:5

K601 /143.A6 +B.29-33BBX04B:3

NOTE:
16BBX04B,24BBX04B TB GROUP TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 142
n. sheet 143

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /142.E3
+B.09-1XX2:4

K601 /142.E6
+B.25-24BBX04B:1

** TO BE IDENTIFIED AT SITE

BAY-433 RPH LBB INIT.		-X71 + 1	K635
(FUTURE USE)			
P7#BI.01	220-250VDC	/151.A6 - 2	-1XX2 5
BAY-433 YPH LBB INIT.		-X71 + 3	K636
(FUTURE USE)			
P7#BI.02	220-250VDC	/151.B6 - 4	
BAY-433 BPH LBB INIT.		-X71 + 5	K637
(FUTURE USE)			
P7#BI.03	220-250VDC	/151.B6 - 6	
BAY-433 3PH LBB INIT.		-X71 + 7	K638
(FUTURE USE)			
P7#BI.04	220-250VDC	/151.B6 - 8	
BAY-436 RPH LBB INIT.		-X71 + 9	K639
(FUTURE USE)			
P7#BI.05	220-250VDC	/151.C6 - 10	
BAY-436 YPH LBB INIT.		-X71 + 11	K640
(FUTURE USE)			
P7#BI.06	220-250VDC	/151.C6 - 12	
BAY-436 BPH LBB INIT.		-X71 + 13	K641
(FUTURE USE)			
P7#BI.07	220-250VDC	/151.C6 - 14	
BAY-436 3PH LBB INIT.		-X71 + 15	K642
(FUTURE USE)			
P7#BI.08	220-250VDC	/151.D6 - 16	

+BAY-433
FUTURE BAY
-33BBX04B
REF.DRG.NO:####
SHT.NO:##

+BAY-436
FUTURE BAY
-36BBX04B
REF.DRG.NO:####
SHT.NO:##

NOTE:
33BBX04B,36BBX04B TB GROUP
TO BE ADDED NEW

K602 /144.A3
+B.09-1XX2:6

K601 /144.A6
+B.33-39BBX04B:3

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 143
n. sheet 144

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

K602 /143.E3
+B.09-1XX2:5

K601 /143.E6
+B.29-36BBX04B:3

** TO BE IDENTIFIED AT SITE

BAY-439 RPH LBB INIT.		-X72 + 1	K643
(FUTURE USE)		-1XX2 6	
P7#BI.09	220-250VDC	/151.A7 - 2	
BAY-439 YPH LBB INIT.		-X72 + 3	K644
(FUTURE USE)			
P7#BI.10	220-250VDC	/151.B7 - 4	
BAY-439 BPH LBB INIT.		-X72 + 5	K645
(FUTURE USE)			
P7#BI.11	220-250VDC	/151.B7 - 6	
BAY-439 3PH LBB INIT.		-X72 + 7	K646
(FUTURE USE)			
P7#BI.12	220-250VDC	/151.B7 - 8	

-39BBX04B
3 4 5 6 7

+BAY-439
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

BAY-442 RPH LBB INIT.		-X72 + 9	K647
(FUTURE USE)			
P7#BI.13	220-250VDC	/151.C7 - 10	
BAY-442 YPH LBB INIT.		-X72 + 11	K648
(FUTURE USE)			
P7#BI.14	220-250VDC	/151.C7 - 12	
BAY-442 BPH LBB INIT.		-X72 + 13	K649
(FUTURE USE)			
P7#BI.15	220-250VDC	/151.C7 - 14	
BAY-442 3PH LBB INIT.		-X72 + 15	K650
(FUTURE USE)			
P7#BI.16	220-250VDC	/151.D7 - 16	

-42BBX04B
3 4 5 6 7

+BAY-442
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

K602 /146.A5
+B.33-X04:154

K601 /146.A5
+D.05-D05.01:2 (-X41)

NOTE:
39BBX04B,42BBX04B TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

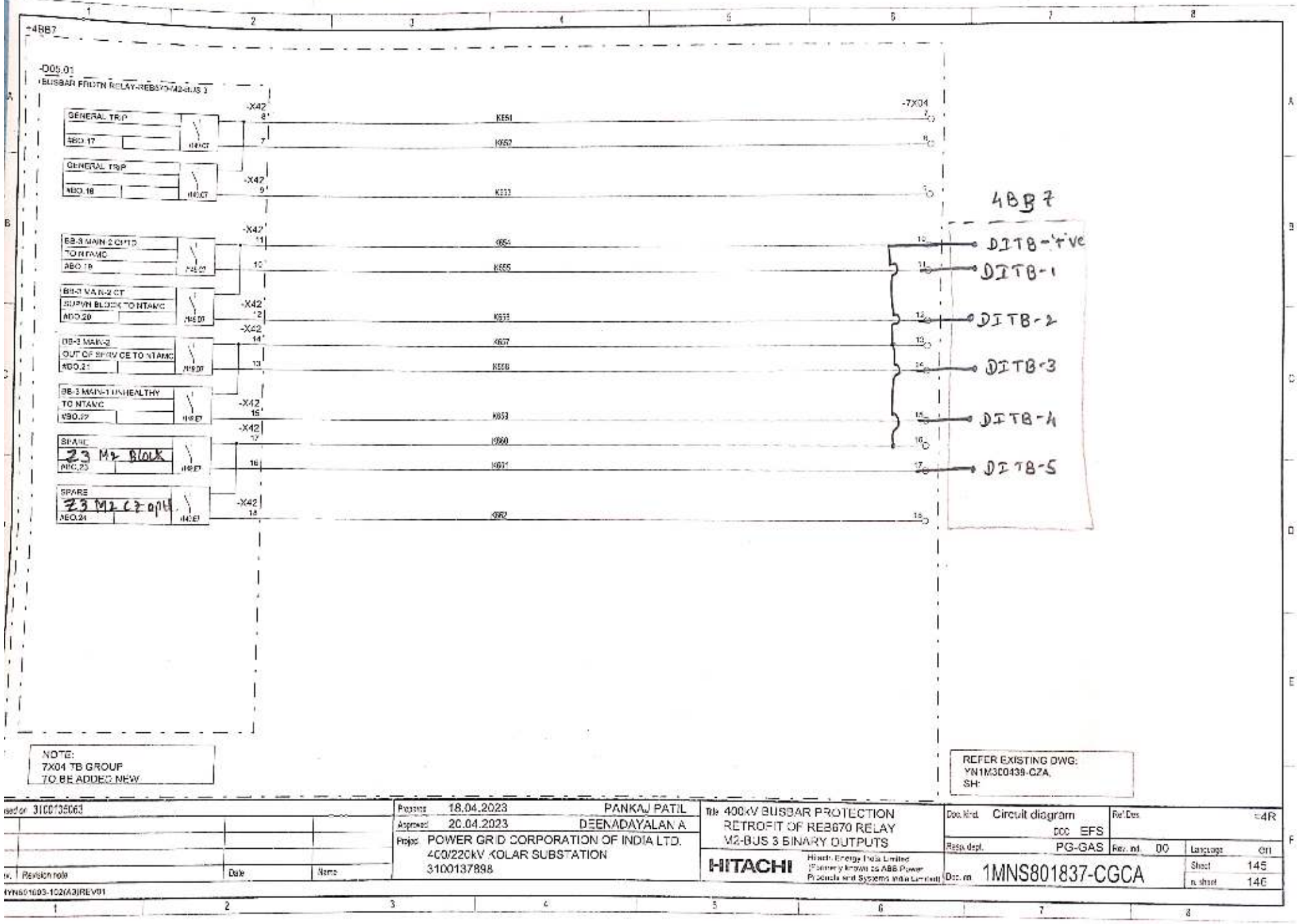
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 144
n. sheet 145

1MYN691003-102(A3)REV01

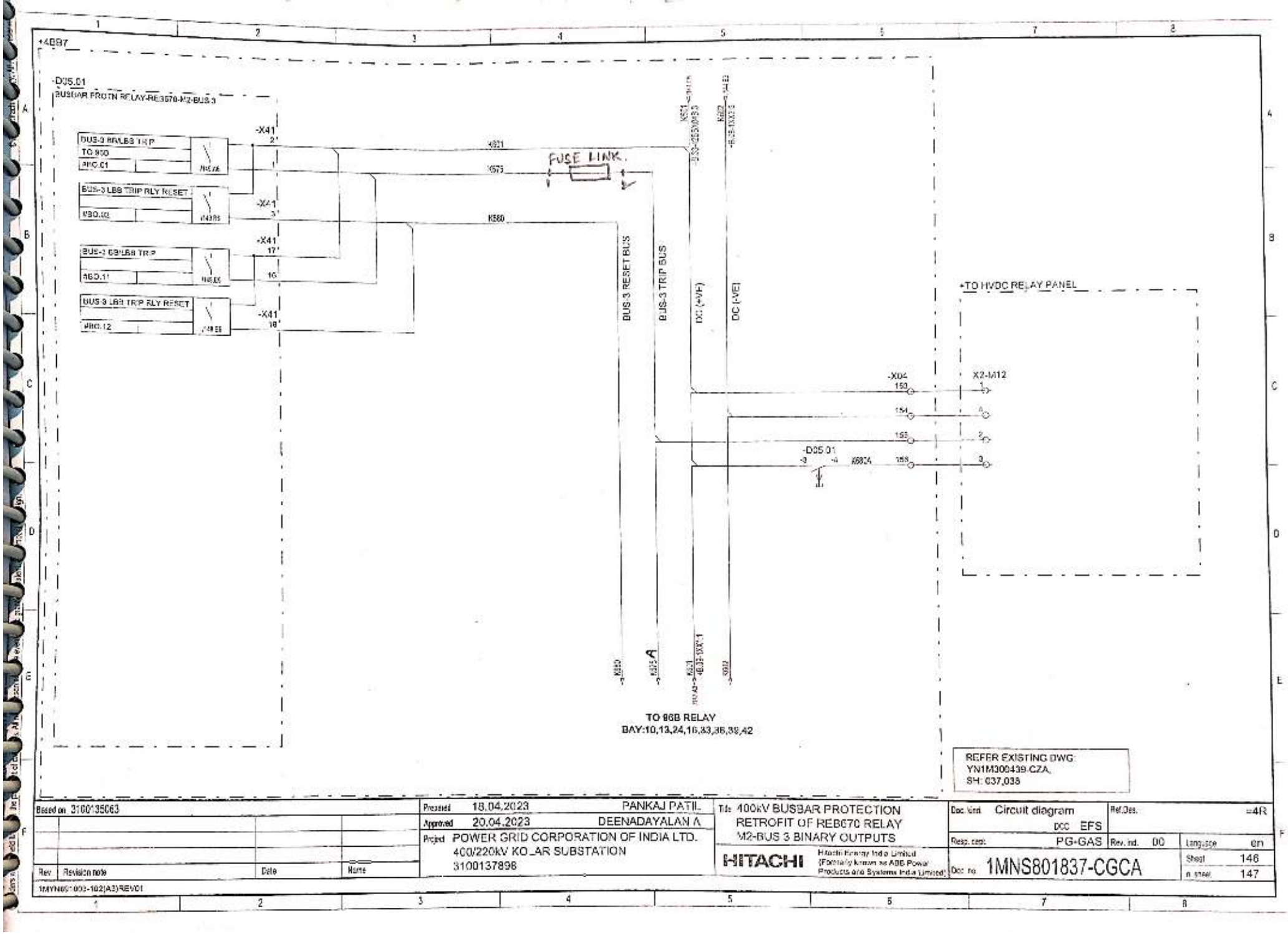
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Prepared	18.04.2023	PANKAJ PATIL	
Approved	20.04.2023	DEENADAYALAN A	
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898		
Title	400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY OUTPUTS		
Doc. kind	Circuit diagram	Ref Des	=4R
	DOC EFS		
Resp dept	PG-GAS	Rev. ind. 00	Language en
Doc. no	1MNS801837-CGCA	Sheet	145
		n. sheet	146

HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY-410 RPH LBB RETRIP-M2	#BO.03	/149.B6	-X41 5 / 4	-1XX1 1	7P13
BAY-410 YPH LBB RETRIP-M2	#BO.04	/149.C6	-X41 6		7P15
BAY-410 BPH LBB RETRIP-M2	#BO.05	/149.C6	-X41 8 / 7		7P17
BAY-413 RPH LBB RETRIP-M2	#BO.06	/149.C6	-X41 9		7P19
BAY-413 YPH LBB RETRIP-M2	#BO.07	/149.C6	-X41 11 / 10	-1XX1 2	7P21
BAY-413 BPH LBB RETRIP-M2	#BO.08	/149.D6	-X41 12		7P23
BAY-424 RPH LBB RETRIP-M2	#BO.09	/149.D6	-X41 14 / 13		7P25
BAY-424 YPH LBB RETRIP-M2	#BO.10	/149.E6	-X41 15		7P27
BAY-424 BPH LBB RETRIP-M2	#BO.01	/150.A2	-X61 2 / 1	-1XX1 3	7P29
BAY-416 LBB RETRIP-M2	#BO.02	/150.B2	-X61 3		7P31
BAY-433 RPH LBB RETRIP-M2	#BO.03	/150.B2	-X61 5 / 4		7P33
BAY-433 YPH LBB RETRIP-M2	#BO.04	/150.B2	-X61 6		7P35

K601 /146.E5 +D.05-D05.01:-3

K601 /147.A6 +B.09-1XX1:4

-7X04 20 21 22 23 24 25 26 27 28 29 30 31

NOTE:
1XX1, 7X04 TB GROUP
TO BE ADDED NEW

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BAY-433 BPH LBB RETRIP-M2	#BO.05	/150.C2	-X61 8 / 7	-1XX1 4	7P37
BAY-436 RPH LBB RETRIP-M2	#BO.06	/150.C2	-X61 9		7P39
BAY-436 YPH LBB RETRIP-M2	#BO.07	/150.C2	-X61 11 / 10		7P41
BAY-436 BPH LBB RETRIP-M2	#BO.08	/150.D2	-X61 12		7P43
BAY-439 RPH LBB RETRIP-M2	#BO.09	/150.D2	-X61 14 / 13	-1XX1 5	7P45
BAY-439 YPH LBB RETRIP-M2	#BO.10	/150.D2	-X61 15		7P47
BAY-439 BPH LBB RETRIP-M2	#BO.11	/150.E2	-X61 17 / 16		7P49
BAY-442 RPH LBB RETRIP-M2	#BO.12	/150.E2	-X61 18		7P51
BAY-442 YPH LBB RETRIP-M2	#BO.13	/150.A4	-X62 2 / 1	-1XX1 6	7P53
BAY-442 BPH LBB RETRIP-M2	#BO.14	/150.B4	-X62 3		7P55

K601 /147.E3 +B.09-1XX1:3

-7X04 32 33 34 35 36 37 38 39 40 41

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 147
n. sheet 148

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
PSM
90-250VDC

-X11

4 +
5 -
/138.B3
90-250VDC
PE

-X11
2
3 /67.E7
1

BUSBAR RELAY FAULTY
BUS-3 MAIN-2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
TRM
1A, 50/60Hz

-X401

BAY_410_R PHASE HOODY LINE-2 P40#AI.01 CT: 1A	+ 1 - 2	/134.A2	BAY_433_R PHASE FUTURE BAY P40#AI.01 CT: 1A	+ 1 - 2	/136.A2
BAY_410_Y PHASE HOODY LINE-2 P40#AI.02 CT: 1A	+ 3 - 4	/134.B2	BAY_433_Y PHASE FUTURE BAY P40#AI.02 CT: 1A	+ 3 - 4	/136.B2
BAY_410_B PHASE HOODY LINE-2 P40#AI.03 CT: 1A	+ 5 - 6	/134.B2	BAY_433_B PHASE FUTURE BAY P40#AI.03 CT: 1A	+ 5 - 6	/136.B2
BAY_413_R PHASE CUDDAPAH LINE P40#AI.04 CT: 1A	+ 7 - 8	/134.D2	BAY_436_R PHASE FUTURE BAY P40#AI.04 CT: 1A	+ 7 - 8	/136.D2
BAY_413_Y PHASE CUDDAPAH LINE P40#AI.05 CT: 1A	+ 9 - 10	/134.D2	BAY_436_Y PHASE FUTURE BAY P40#AI.05 CT: 1A	+ 9 - 10	/136.D2
BAY_413_B PHASE CUDDAPAH LINE P40#AI.06 CT: 1A	+ 11 - 12	/134.E2	BAY_436_B PHASE FUTURE BAY P40#AI.06 CT: 1A	+ 11 - 12	/136.E2
BAY_416_R PHASE BUS SECTION P40#AI.07 CT: 1A	+ 13 - 14	/135.A2	BAY_439_R PHASE FUTURE BAY P40#AI.07 CT: 1A	+ 13 - 14	/137.A2
BAY_416_Y PHASE BUS SECTION P40#AI.08 CT: 1A	+ 15 - 16	/135.B2	BAY_439_Y PHASE FUTURE BAY P40#AI.08 CT: 1A	+ 15 - 16	/137.B2
BAY_416_B PHASE BUS SECTION P40#AI.09 CT: 1A	+ 17 - 18	/135.B2	BAY_439_B PHASE FUTURE BAY P40#AI.09 CT: 1A	+ 17 - 18	/137.B2
BAY_424_R PHASE CONVERTER-2 P40#AI.10 CT: 1A	+ 19 - 20	/135.D2	BAY_442_R PHASE FUTURE BAY P40#AI.10 CT: 1A	+ 19 - 20	/137.D2
BAY_424_Y PHASE CONVERTER-2 P40#AI.11 CT: 1A	+ 21 - 22	/135.D2	BAY_442_Y PHASE FUTURE BAY P40#AI.11 CT: 1A	+ 21 - 22	/137.D2
BAY_424_B PHASE CONVERTER-2 P40#AI.12 CT: 1A	+ 23 - 24	/135.E2	BAY_442_B PHASE FUTURE BAY P40#AI.12 CT: 1A	+ 23 - 24	/137.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 148
n. sheet 149

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X31

MAIN 2 BUS 3PROT IN	P3#BI.01	220-250VDC	+ 1 / - 2	/139.B2
MAIN 2 BUS 3 PROT OUT	P3#BI.02	220-250VDC	+ 3 / - 4	/139.B2
SPARE	P3#BI.03	220-250VDC	+ 5 / - 6	/139.C2
TRIP RELAY RESET 96B BUS -3	P3#BI.04	220-250VDC	+ 7 / - 8	/139.C2
SPARE	P3#BI.05	220-250VDC	+ 9 / - 10	/139.C2
SPARE	P3#BI.06	220-250VDC	+ 11 / - 12	/139.D2
SPARE	P3#BI.07	220-250VDC	+ 13 / - 14	/139.D2
REB670 RELAY FAULTY BUS 3 - MAIN 1	P3#BI.08	220-250VDC	+ 15 / - 16	/139.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X32

BAY410-EXT.LBB OPERATED	P3#BI.09	220-250VDC	+ 1 / - 2	/140.B2
BAY413-EXT.LBB OPERATED	P3#BI.10	220-250VDC	+ 3 / - 4	/140.B2
BAY416-EXT.LBB OPERATED	P3#BI.11	220-250VDC	+ 5 / - 6	/140.C2
BAY424-EXT.LBB OPERATED	P3#BI.12	220-250VDC	+ 7 / - 8	/140.C2
BAY433-EXT.LBB OPERATED	P3#BI.13	220-250VDC	+ 9 / - 10	/140.D2
BAY436-EXT.LBB OPERATED	P3#BI.14	220-250VDC	+ 11 / - 12	/140.D2
BAY439-EXT.LBB OPERATED	P3#BI.15	220-250VDC	+ 13 / - 14	/140.E2
BAY442-EXT.LBB OPERATED	P3#BI.16	220-250VDC	+ 15 / - 16	/140.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X41

BUS-3 BB/LBB TRIP TO 96B	#BO.01	2 / 1	/146.B2
BUS-3 LBB TRIP RLY RESET	#BO.02	3	/146.B2
BAY-410 RPH LBB RETRIP-M2	#BO.03	5 / 4	/147.B2
BAY-410 YPH LBB RETRIP-M2	#BO.04	6	/147.B2
BAY-410 BPH LBB RETRIP-M2	#BO.05	8 / 7	/147.B2
BAY-413 RPH LBB RETRIP-M2	#BO.06	9	/147.C2
BAY-413 YPH LBB RETRIP-M2	#BO.07	11 / 10	/147.C2
BAY-413 BPH LBB RETRIP-M2	#BO.08	12	/147.C2
BAY-424 RPH LBB RETRIP-M2	#BO.09	14 / 13	/147.D2
BAY-424 YPH LBB RETRIP-M2	#BO.10	15	/147.D2
BUS-3 BB/LBB TRIP	#BO.11	17 / 16	/146.B2
BUS-3 LBB TRIP RLY RESET	#BO.12	18	/146.C2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X42

BUSBAR-3 OPTD ANNUNCIATION CKT	#BO.13	2 / 1	/173.E5
BB-3 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.E5
BUSBAR-3 Rph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.D2
BUSBAR-3 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.E2
GENERAL TRIP	#BO.17	8 / 7	/145.A2
GENERAL TRIP	#BO.18	9	/145.B2
BB-3 MAIN-2 OPTD TO NTAMC	#BO.19	11 / 10	/145.B2
BB-3 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/145.C2
BB-3 MAIN-2 OUT OF SERVICE TO NTAMC	#BO.21	14 / 13	/145.C2
BB-3 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/145.C2
SPARE	#BO.23	17 / 16	/145.D2
SPARE	#BO.24	18	/145.D2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Resp. dept. PG-GAS
Doc. no. 1MNS801837-CGCA

Ref.Des. =4R
Rev. ind. 01
Language en
Sheet 149
n. sheet 150

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X61

BAY-424 BPH LBB RETRIP-M2	#BO.01	2 / 1	/147.D2
BAY-416 LBB RETRIP-M2	#BO.02	3	/147.E2
BAY-433 RPH LBB RETRIP-M2	#BO.03	5 / 4	/147.E2
BAY-433 YPH LBB RETRIP-M2	#BO.04	6	/147.E2
BAY-433 BPH LBB RETRIP-M2	#BO.05	8 / 7	/147.B5
BAY-436 RPH LBB RETRIP-M2	#BO.06	9	/147.B5
BAY-436 YPH LBB RETRIP-M2	#BO.07	11 / 10	/147.B5
BAY-436 BPH LBB RETRIP-M2	#BO.08	12	/147.C5
BAY-439 RPH LBB RETRIP-M2	#BO.09	14 / 13	/147.C5
BAY-439 YPH LBB RETRIP-M2	#BO.10	15	/147.C5
BAY-439 BPH LBB RETRIP-M2	#BO.11	17 / 16	/147.D5
BAY-442 RPH LBB RETRIP-M2	#BO.12	18	/147.D5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BOM

-X62

BAY-442 YPH LBB RETRIP-M2	#BO.13	2 / 1	/147.D5
BAY-442 BPH LBB RETRIP-M2	#BO.14	3	/147.E5
BUSBAR-3 Bph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.E2
BB-3 CT SUPVN EVENT LOGGER CKT	#BO.16	6	/175.E2
BAY-410 BB/LBB TRIP	#BO.17	8 / 7	
BAY-413 BB/LBB TRIP	#BO.18	9	
BAY-424 BB/LBB TRIP	#BO.19	11 / 10	
BAY-416 BB/LBB TRIP	#BO.20	12	
BAY-433 BB/LBB TRIP	#BO.21	14 / 13	
BAY-436 BB/LBB TRIP	#BO.22	15	
BAY-439 BB/LBB TRIP	#BO.23	17 / 16	
BAY-442 BB/LBB TRIP	#BO.24	18	

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 150
Doc. no. 1MNS801837-CGCA
n. sheet 151

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB7

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X51

BAY-410 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	/141.B2
BAY-410 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	/141.B2
BAY-410 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	/141.C2
BAY-410 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	/141.C2
BAY-413 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	/141.D2
BAY-413 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	/141.D2
BAY-413 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	/141.E2
BAY-413 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	/141.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X52

SPARE	(FUTURE USE)	P5#BI.09	220-250VDC	/142.B2
SPARE	(FUTURE USE)	P5#BI.10	220-250VDC	/142.B2
SPARE	(FUTURE USE)	P5#BI.11	220-250VDC	/142.C2
BAY-416 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	/142.C2
BAY-424 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	/142.D2
BAY-424 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	/142.D2
BAY-424 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	/142.E2
BAY-424 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	/142.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X71

BAY-433 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	/143.B2
BAY-433 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	/143.B2
BAY-433 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	/143.C2
BAY-433 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	/143.C2
BAY-436 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	/143.D2
BAY-436 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	/143.D2
BAY-436 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	/143.E2
BAY-436 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	/143.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3
BIM
220-250VDC

-X72

BAY-439 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	/144.B2
BAY-439 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	/144.B2
BAY-439 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	/144.C2
BAY-439 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	/144.C2
BAY-442 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	/144.D2
BAY-442 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	/144.D2
BAY-442 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	/144.E2
BAY-442 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	/144.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

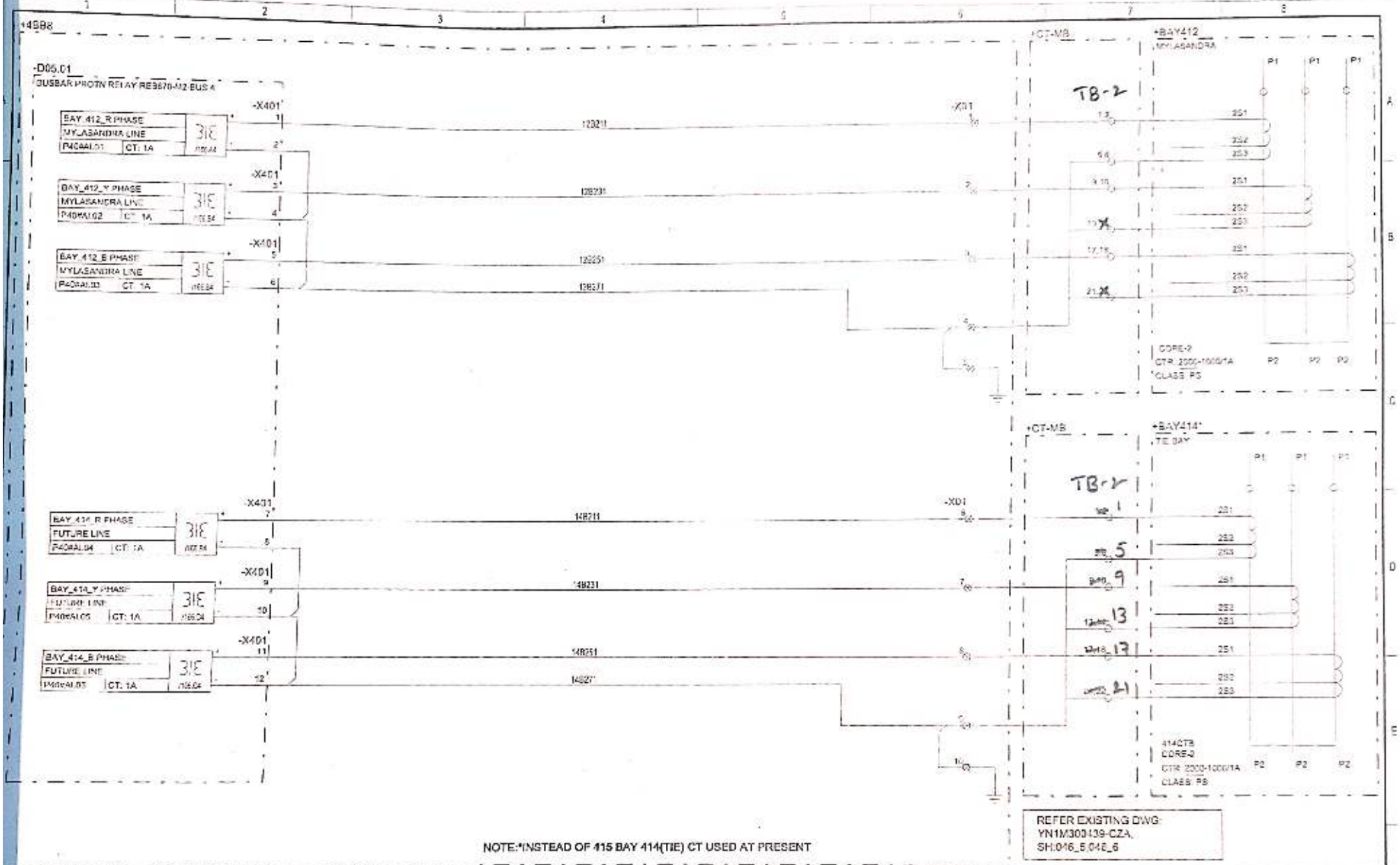
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 3 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 151
n. sheet 152

1MYN691003-102(A3)REV01

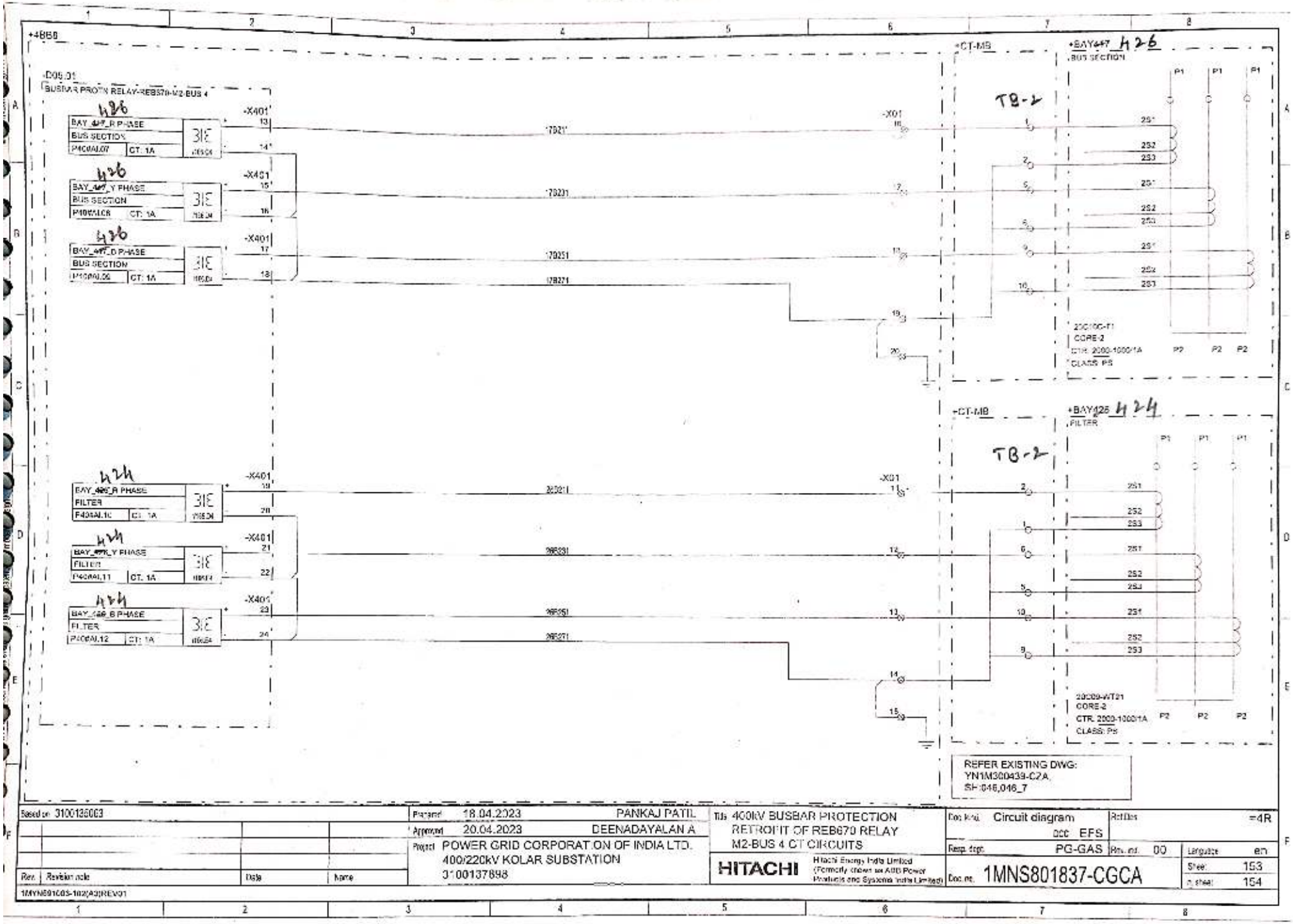
The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



ord 3100135053	Prepared 18.04.2023 PANKAJ PATIL	TI: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 CT CIRCUITS	Doc.kind Circuit diagram DOC EFS	Ref.Des.	=4R
	Approved 20.04.2023 DEENADAYALAN A				
	Project POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	HITACHI Hitachi Energy India Limited (Formerly known as AEB Power Products and Systems India Limited)	Resp. dept. PG-GAS	Rev. ind 00	Language en
			Doc. no. 1MNS801837-CGCA	Sheet 152	n. shee 153
Revision note	Date Name				

09000-102[A3]REV01

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB8

-D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4

BAY_435_R PHASE			
FUTURE BAY			
P40#AI.01	CT: 1A		/166.A6

BAY_435_Y PHASE			
FUTURE BAY			
P40#AI.02	CT: 1A		/166.B6

BAY_435_B PHASE			
FUTURE BAY			
P40#AI.03	CT: 1A		/166.B6

-X401: + 1, - 2 | 35B212 | -D21.113.101: 7B | 7A /156.B8 | 35B211 | **-X01: 21

-X401: + 3, - 4 | 35B232 | 8B | 8A /156.B8 | 35B231 | 22

-X401: + 5, - 6 | 35B252 | 9B | 9A /156.B8 | 35B251 | 23

35B272 | 10B | 10A /156.B8 | 35B271 | 24

25

**

+CT-MB

+BAY435

FUTURE BAY

P1 P1 P1

2S1 2S2 2S3

2S1 2S2 2S3

2S1 2S2 2S3

CORE-2

CTR: 2000-1000/1A

CLASS: PS

P2 P2 P2

BAY_438_R PHASE			
FUTURE BAY			
P40#AI.04	CT: 1A		/166.B6

BAY_438_Y PHASE			
FUTURE BAY			
P40#AI.05	CT: 1A		/166.C6

BAY_438_B PHASE			
FUTURE BAY			
P40#AI.06	CT: 1A		/166.C6

-X401: + 7, - 8 | 38B212 | -D21.113.101: 11B | 11A /156.B8 | 38B211 | **-X01: 26

-X401: + 9, - 10 | 38B232 | 12B | 12A /156.B8 | 38B231 | 27

-X401: + 11, - 12 | 38B252 | 13B | 13A /156.C8 | 38B251 | 28

38B272 | 14B | 14A /156.C8 | 38B271 | 29

30

**

+CT-MB

+BAY438

FUTURE BAY

P1 P1 P1

2S1 2S2 2S3

2S1 2S2 2S3

2S1 2S2 2S3

CORE-2

CTR: 2000-1000/1A

CLASS: PS

P2 P2 P2

NOTE:
X01 TB GROUP TO
BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

NOTE ** TB TO BE IDENTIFY AT SITE

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL

Approved 20.04.2023 DEENADAYALAN A

Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram DCC EFS

Ref.Des. =4R

Resp. dept. PG-GAS

Rev. ind. 01

Language en

Doc. no. 1MNS801837-CGCA

Sheet 154

n. sheet 155

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

BAY_441_R PHASE			
FUTURE BAY			
P40#AI.07	CT: 1A	/166.C6	

BAY_441_Y PHASE			
FUTURE BAY			
P40#AI.08	CT: 1A	/166.D6	

BAY_441_B PHASE			
FUTURE BAY			
P40#AI.09	CT: 1A	/166.D6	

-X401 13(+) 14(-) 41B212
-X401 15(+) 16(-) 41B232
-X401 17(+) 18(-) 41B252
-X401 41B272

-D21.125.101
3A 41B211 /156.D8 — 3B
4A 41B231 /156.D8 — 4B
5A 41B251 /156.D8 — 5B
6A 41B271 /156.D8 — 6B

** -X01
31 32 33 34 35

+CT-MB

+BAY441
FUTURE BAY
P1 P1 P1
2S1 2S2 2S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

+CT-MB

+BAY444
FUTURE BAY

BAY_444_R PHASE			
FUTURE BAY			
P40#AI.10	CT: 1A	/166.D6	

BAY_444_Y PHASE			
FUTURE BAY			
P40#AI.11	CT: 1A	/166.E6	

BAY_444_B PHASE			
FUTURE BAY			
P40#AI.12	CT: 1A	/166.E6	

-X401 19(+) 20(-) 44B212
-X401 21(+) 22(-) 44B232
-X401 23(+) 24(-) 44B252
-X401 44B272

-D21.125.101
7A 44B211 /156.D8 — 7B
8A 44B231 /156.D8 — 8B
9A 44B251 /156.E8 — 9B
10A 44B271 /156.E8 — 10B

** -X01
36 37 38 39 40

P1 P1 P1
2S1 2S2 2S3 (**)
CORE-2
CTR: 2000-1000/1A
CLASS: PS
P2 P2 P2

NOTE:
X01 TB GROUP TO
BE ADDED NEW

NOTE ** TB TO BE IDENTIFY AT SITE

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 CT CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 155
n. sheet 156

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB8

FROM SH: 031/4

-X13 -B13-01 -B13-02

PSM -X11

90-250VDC

PE /166.B1

K801 +D.23-D23.02:1P3 /157.A5

K802 +B.09-1XX2:1 /157.A3

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
LED

1	DIFF OPTD.
2	EXT LBB OPTD
3	RPH TRIP
4	YPH TRIP
5	BPH TRIP
6	BB BLOCKED
7	RPH OCT ALARM
8	YPH OCT ALARM
9	BPH OCT ALARM
10	96B OPTD
11	
12	
13	
14	
15	

O: Open

I: Closed

C: Cancel/Clear

E: Enter/Select/Execute

L/R: Local/Remote/off

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
SFP

-X301

IEC61850 PROTOCOL		LC	Rx
Ethernet port			
P30:1	100FX	LC	Tx

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

F1	OCT RESET
F2	SPARE
F3	SPARE
F4	SPARE
F5	LED RESET

REFER EXISTING DWG:
YN1M300439-CZA,
SH: 048

LIST OF FUNCTIONS
AVAILABLE IN RELAY
1) Differential Protection (PDIF,87BB)
2) Breaker Failure Protection(50LBB)
3) Disturbance Recorder(RDRE)
4) Event Recorder (RDRE)

-D21.101.101

Test / Normal		
1B	1A	
2B	2A	
3B	3A	
4B	4A	/152.A4
5B	5A	/152.B4
6B	6A	/152.B4
7B	7A	/152.B4
8B	8A	/152.D4
9B	9A	/152.D4
10B	10A	/152.E4
11B	11A	/152.E4
12B	12A	/153.A4
13B	13A	/153.B4
14B	14A	/153.B4
15B	15A	/153.B4
16B	16A	
17B	17A	
18B	18A	

-D21.113.101

Test / Normal		
1B	1A	
2B	2A	
3B	3A	/153.D4
4B	4A	/153.D4
5B	5A	/153.E4
6B	6A	/153.E4
7B	7A	/154.A4
8B	8A	/154.B4
9B	9A	/154.B4
10B	10A	/154.B4
11B	11A	/154.D4
12B	12A	/154.D4
13B	13A	/154.E4
14B	14A	/154.E4
15B	15A	
16B	16A	
17B	17A	
18B	18A	

-D21.125.101

Test / Normal		
1B	1A	
2B	2A	
3B	3A	/155.A4
4B	4A	/155.B4
5B	5A	/155.B4
6B	6A	/155.B4
7B	7A	/155.D4
8B	8A	/155.D4
9B	9A	/155.E4
10B	10A	/155.E4
11B	11A	
12B	12A	
13B	13A	
14B	14A	
15B	15A	
16B	16A	
17B	17A	
18B	18A	

Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 PSM & COM

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
	DCC EFS		
Resp. dept.	PG-GAS	Rev. ind.	01
Language	en		
Sheet	156		
n. sheet	157		
Doc. no.	1MNS801837-CGCA		

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

+D.05-D05.01:5 (-X11) /156.B2 K802

+D.05-D05.01:4 (-X11) /156.B2 K801

-X31 1	MAIN 2 BUS 4 PROT IN	P3#BI.01 220-250VDC	/167.A2
-X31 3	MAIN 2 BUS 4 PROT OUT	P3#BI.02 220-250VDC	/167.B2
-X31 5	SPARE	P3#BI.03 220-250VDC	/167.B2
-X31 7	TRIP RELAY RESET 96B BUS-4	P3#BI.04 220-250VDC	/167.B2
-X31 9	SPARE	P3#BI.05 220-250VDC	/167.C2
-X31 11	SPARE	P3#BI.06 220-250VDC	/167.C2
-X31 13	SPARE	P3#BI.07 220-250VDC	/167.C2
-X31 15	REB670 RELAY FAULTY BUS 4 - MAIN 1	P3#BI.08 220-250VDC	/167.D2

-1XX2 1

K803 -D23.02 1P3 1P4 /157.A7 IN
BB-4 M2 IN/OUT SWITCH

K804 -D23.02 1P2 /157.A7 OUT 1P1
BB-4 M2 IN/OUT SWITCH

K805 -8X04 1

K801 /171.E8

K806 /171.D5 +D.13-D13.101.101:221 -8X04 2

K807 3

K808 4

K809 5

K810 -X14A 3 -X14A 3 +D.05 -X11 2

-X14A 4 -X14A 4 -X11 3 BUSBAR RELAY FAULTY BUS-4 MAIN-1 /94.B2 -X11 1

+4BB8

-D23.02
1P2 /157.B4
1P1 C 1P3
1P4 /157.B3
A
2P2
2P1 C 2P3
2P4
A
3P2
3P1 C 3P3
3P4
A
4P2
4P1 C 4P3
4P4
A
IN A
OUT C

BB-4 M2 IN/OUT SWITCH

+4BB4

NOTE:
8X04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

+B.09-1XX2:2 K802 /158.A3

+B.33-X04:13 K801 /158.A5

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

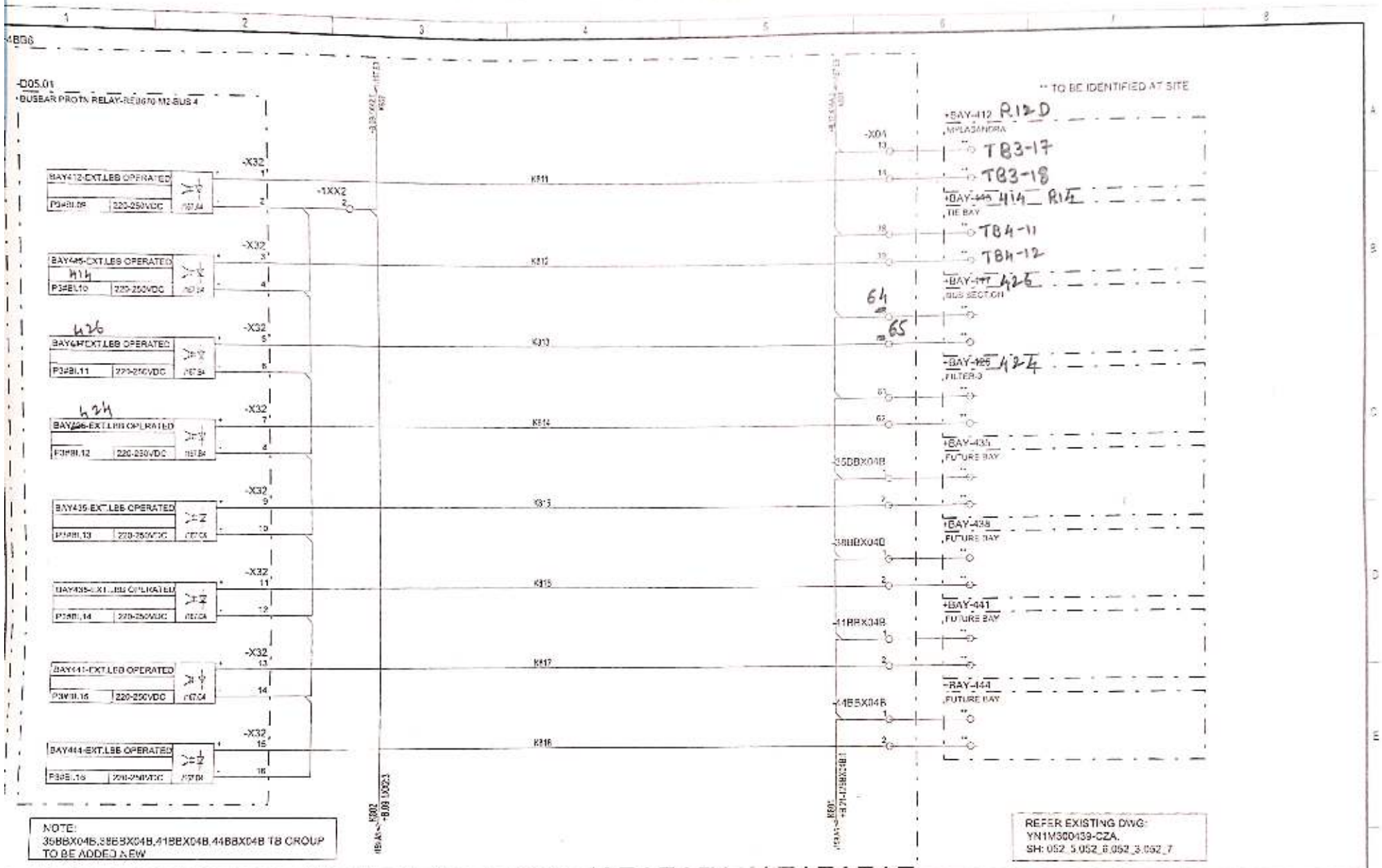
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 157
n. sheet 158

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



Prepared	18.04.2023	PANKAJ PATIL	Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS	Doc kind: Circuit diagram	Ref.Des. R4R
Approved	20.04.2023	DEENADAYALAN A		DOC EFS	
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137895			Resp. dept. PG-GAS	Rev. ind. 00
			HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Language en
					Sheet 158
					No. of sheets 159

Revision note | Date | Name

Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 /1158.E3
+B.09-1XX2:2

K801 /1158.E5
+B.33-44BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-412
MYLASANDRA
REF.DRG.NO:####
SHT.NO:##

-12BBX04B

BAY-412 RPH LBB INIT.		-X51 + 1	K819	-1XX2 3	1	**
(FUTURE USE)					2	**
P5#BI.01	220-250VDC	- 2 /169.A2				
BAY-412 YPH LBB INIT.		-X51 + 3	K820		3	**
(FUTURE USE)						
P5#BI.02	220-250VDC	- 4 /169.B2				
BAY-412 BPH LBB INIT.		-X51 + 5	K821		4	**
(FUTURE USE)						
P5#BI.03	220-250VDC	- 6 /169.B2				
BAY-412 3PH LBB INIT.		-X51 + 7	K822		5	**
(FUTURE USE)						
P5#BI.04	220-250VDC	- 8 /169.B2				

+BAY-415
TIE BAY
REF.DRG.NO:####
SHT.NO:##

-15BBX04B

BAY-415 RPH LBB INIT.		-X51 + 9	K823		1	**
(FUTURE USE)					2	**
P5#BI.05	220-250VDC	- 10 /169.C2				
BAY-415 YPH LBB INIT.		-X51 + 11	K824		3	**
(FUTURE USE)						
P5#BI.06	220-250VDC	- 12 /169.C2				
BAY-415 BPH LBB INIT.		-X51 + 13	K825		4	**
(FUTURE USE)						
P5#BI.07	220-250VDC	- 14 /169.C2				
BAY-415 3PH LBB INIT.		-X51 + 15	K826		5	**
(FUTURE USE)						
P5#BI.08	220-250VDC	- 16 /169.D2				

K802 /160.A3
+B.09-1XX2:4

K801 /160.A6
+B.25-17BBX04B:1

NOTE:
12BBX04B,15BBX04B TB GROUP TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 159
n. sheet 160

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 ◁/159.E3
+B.09-1XX2:3

K801 ◁/159.E6
+B.21-15BBX04B:1

** TO BE IDENTIFIED AT SITE

SPARE		-X52	1 (+)	K827
(FUTURE USE)			2 (-)	-1XX2 4
P5#BI.09	220-250VDC	/169.A4		
SPARE		-X52	3 (+)	K828
(FUTURE USE)			4 (-)	
P5#BI.10	220-250VDC	/169.B4		
SPARE		-X52	5 (+)	K829
(FUTURE USE)			6 (-)	
P5#BI.11	220-250VDC	/169.B4		
BAY-417 3PH LBB INIT.		-X52	7 (+)	K830
(FUTURE USE)			8 (-)	
P5#BI.12	220-250VDC	/169.B4		
BAY-426 RPH LBB INIT.		-X52	9 (+)	K831
(FUTURE USE)			10 (-)	
P5#BI.13	220-250VDC	/169.C4		
BAY-426 YPH LBB INIT.		-X52	11 (+)	K832
(FUTURE USE)			12 (-)	
P5#BI.14	220-250VDC	/169.C4		
BAY-426 BPH LBB INIT.		-X52	13 (+)	K833
(FUTURE USE)			14 (-)	
P5#BI.15	220-250VDC	/169.C4		
BAY-426 3PH LBB INIT.		-X52	15 (+)	K834
(FUTURE USE)			16 (-)	
P5#BI.16	220-250VDC	/169.D4		

-17BBX04B
1 ** 2 ** 3 ** 4 ** 5 **

+BAY-417
BUS SECTION
REF.DRG.NO:####
SHT.NO:##

-26BBX04B
1 ** 2 ** 3 ** 4 ** 5 **

+BAY-426
FILTER-3
REF.DRG.NO:####
SHT.NO:##

K802
+B.09-1XX2:5
/161.A3 ◁

K801
+B.29-35BBX04B:3
/161.A6 ◁

NOTE:
17BBX04B,26BBX04B TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 160
n. sheet 161

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 /160.E3
+B.09-1XX2:4

K801 /160.E6
+B.25-26BBX04B:1

** TO BE IDENTIFIED AT SITE

+BAY-435
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

-35BBX04B

BAY-435 RPH LBB INIT.		-X71 +	1	K835	4
(FUTURE USE)				-1XX2	5
P7#BI.01	220-250VDC	/169.A6 -	2		
BAY-435 YPH LBB INIT.		-X71 +	3	K836	5
(FUTURE USE)					
P7#BI.02	220-250VDC	/169.B6 -	4		
BAY-435 BPH LBB INIT.		-X71 +	5	K837	6
(FUTURE USE)					
P7#BI.03	220-250VDC	/169.B6 -	6		
BAY-435 3PH LBB INIT.		-X71 +	7	K838	7
(FUTURE USE)					
P7#BI.04	220-250VDC	/169.B6 -	8		

+BAY-438
FUTURE BAY
REF.DRG.NO:####
SHT.NO:##

-38BBX04B

BAY-438 RPH LBB INIT.		-X71 +	9	K839	4
(FUTURE USE)					
P7#BI.05	220-250VDC	/169.C6 -	10		
BAY-438 YPH LBB INIT.		-X71 +	11	K840	5
(FUTURE USE)					
P7#BI.06	220-250VDC	/169.C6 -	12		
BAY-438 BPH LBB INIT.		-X71 +	13	K841	6
(FUTURE USE)					
P7#BI.07	220-250VDC	/169.C6 -	14		
BAY-438 3PH LBB INIT.		-X71 +	15	K842	7
(FUTURE USE)					
P7#BI.08	220-250VDC	/169.D6 -	16		

K802 /162.A3
+B.09-1XX2:6

K801 /162.A6
+B.33-41BBX04B:3

NOTE:
35BBX04B,38BBX04 TB GROUP
TO BE ADDED NEW

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 161
n. sheet 162

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K802 /161.E3
+B.09-1XX2:5

K801 /161.E6
+B.29-38BBX04B:3

** TO BE IDENTIFIED AT SITE

BAY-441 RPH LBB INIT.		-X72 + 1	K843
(FUTURE USE)		-1XX2 6	
P7#BI.09	220-250VDC	- 2	/169.A7
BAY-441 YPH LBB INIT.		-X72 + 3	K844
(FUTURE USE)			
P7#BI.10	220-250VDC	- 4	/169.B7
BAY-441 BPH LBB INIT.		-X72 + 5	K845
(FUTURE USE)			
P7#BI.11	220-250VDC	- 6	/169.B7
BAY-441 3PH LBB INIT.		-X72 + 7	K846
(FUTURE USE)			
P7#BI.12	220-250VDC	- 8	/169.B7
BAY-444 RPH LBB INIT.		-X72 + 9	K847
(FUTURE USE)			
P7#BI.13	220-250VDC	- 10	/169.C7
BAY-444 YPH LBB INIT.		-X72 + 11	K848
(FUTURE USE)			
P7#BI.14	220-250VDC	- 12	/169.C7
BAY-444 BPH LBB INIT.		-X72 + 13	K849
(FUTURE USE)			
P7#BI.15	220-250VDC	- 14	/169.C7
BAY-444 3PH LBB INIT.		-X72 + 15	K850
(FUTURE USE)			
P7#BI.16	220-250VDC	- 16	/169.D7

+BAY-441
FUTURE BAY
-41BBX04B
REF.DRG.NO:####
SHT.NO:##

+BAY-444
FUTURE BAY
-44BBX04B
REF.DRG.NO:####
SHT.NO:##

NOTE:
41BBX04B,44BBX04B TB GROUP
TO BE ADDED NEW

K802 /164.A5
+B.33-X04:154

K801 /164.A5
+D.05-D05.01:2 (-X41)

REFER EXISTING DWG:
YN1M300439-CZA,
SH:

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

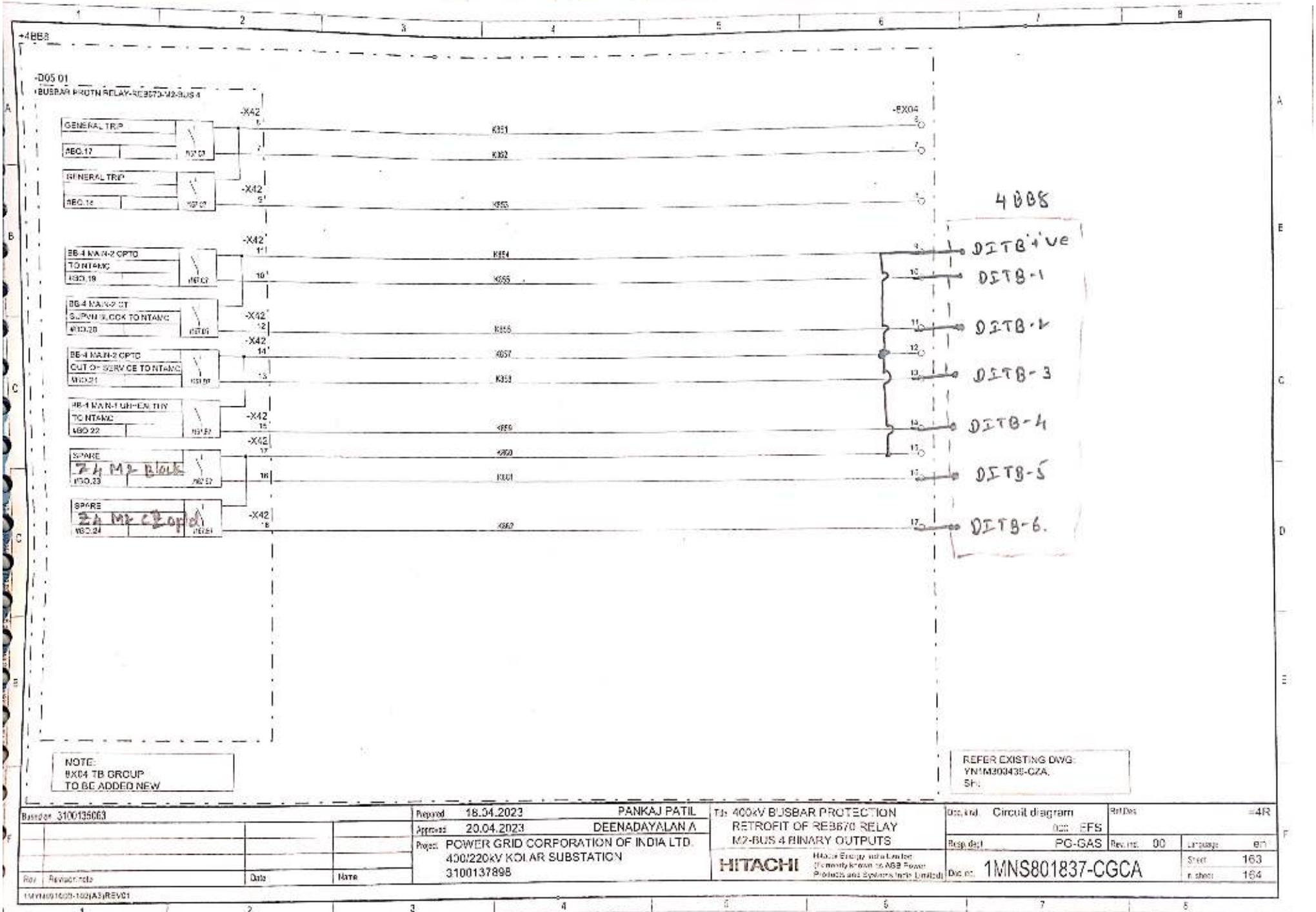
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY INPUTS

HITACHI Hitachi Energy India Limited

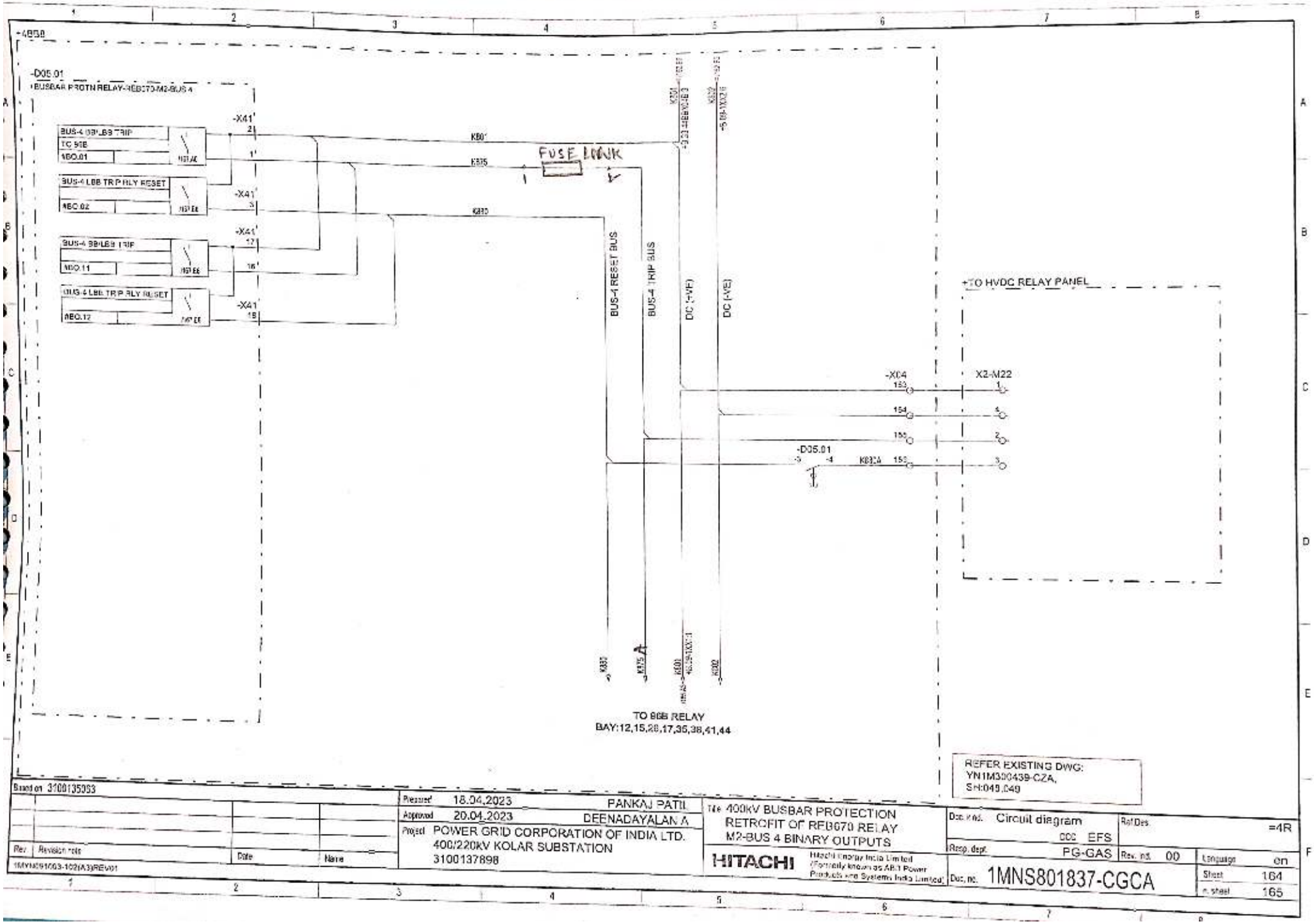
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 162
n. sheet 163

1MYN691003-102(A3)REV01



Basedgr 3100135063	Prepared 18.04.2023 PANKAJ PATIL	TI: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY OUTPUTS	Doc. kind Circuit diagram	Ref.Des	=4R
	Approved 20.04.2023 DEENADAYALAN A		Doc. EFS		
	Project POWER GRID CORPORATION OF INDIA LTD 400/220kV KOLAR SUBSTATION 3100137898		Resp. dept PG-GAS	Rev. no. 00	Language en
Rev. Revision note Date Name		HITACHI Hitachi Energy India Limited (Formerly known as ABB Power Products and Systems India Limited)	Doc. no. 1MNS801837-CGCA	Sheet 163	
1MYM801600-102(A3)REV01				n. sheet 164	

Scanned with OKEN Scanner



Scanned with OKEN Scanner

© 2023 Hitachi Energy. All rights reserved.

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K801 /164.E5 +B.33-X04:153

BAY-412 RPH LBB RETRIP-M2	#BO.03	/167.B6	-X41 5	-1XX1 1	-8X04 18
			-X41 4		8P13
BAY-412 YPH LBB RETRIP-M2	#BO.04	/167.C6	-X41 6		19
					8P15
BAY-412 BPH LBB RETRIP-M2	#BO.05	/167.C6	-X41 8		20
			-X41 7		8P17
BAY-414 RPH LBB RETRIP-M2	#BO.06	/167.C6	-X41 9		21
					8P19
BAY-414 YPH LBB RETRIP-M2	#BO.07	/167.C6	-X41 11	-1XX1 2	22
			-X41 10		8P21
BAY-414 BPH LBB RETRIP-M2	#BO.08	/167.D6	-X41 12		23
					8P23
BAY-426 RPH LBB RETRIP-M2	#BO.09	/167.D6	-X41 14		24
			-X41 13		8P25
BAY-426 YPH LBB RETRIP-M2	#BO.10	/167.E6	-X41 15		25
					8P27
BAY-426 BPH LBB RETRIP-M2	#BO.01	/168.A2	-X61 2	-1XX1 3	26
			-X61 1		8P29
BAY-417 LBB RETRIP-M2	#BO.02	/168.B2	-X61 3		27
					8P31
BAY-435 RPH LBB RETRIP-M2	#BO.03	/168.B2	-X61 5		28
			-X61 4		8P33
BAY-435 YPH LBB RETRIP-M2	#BO.04	/168.B2	-X61 6		29
					8P35

K801 /165.A6 +B.09-1XX1:4

NOTE:
1XX1, 8X04 TB GROUP
TO BE ADDED NEW

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

K801 /165.E3 +B.09-1XX1:3

BAY-435 BPH LBB RETRIP-M2	#BO.05	/168.C2	-X61 8	-1XX1 4	-8X04 30
			-X61 7		8P37
BAY-438 RPH LBB RETRIP-M2	#BO.06	/168.C2	-X61 9		31
					8P39
BAY-438 YPH LBB RETRIP-M2	#BO.07	/168.C2	-X61 11		32
			-X61 10		8P41
BAY-438 BPH LBB RETRIP-M2	#BO.08	/168.D2	-X61 12		33
					8P43
BAY-441 RPH LBB RETRIP-M2	#BO.09	/168.D2	-X61 14	-1XX1 5	34
			-X61 13		8P45
BAY-441 YPH LBB RETRIP-M2	#BO.10	/168.D2	-X61 15		35
					8P47
BAY-441 BPH LBB RETRIP-M2	#BO.11	/168.E2	-X61 17		36
			-X61 16		8P49
BAY-444 RPH LBB RETRIP-M2	#BO.12	/168.E2	-X61 18		37
					8P51
BAY-444 YPH LBB RETRIP-M2	#BO.13	/168.A4	-X62 2	-1XX1 6	38
			-X62 1		8P53
BAY-444 BPH LBB RETRIP-M2	#BO.14	/168.B4	-X62 3		39
					8P55

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 BINARY OUTPUTS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 165
n. sheet 166

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
PSM
90-250VDC

-X11

4 +
5 -
/156.B3
90-250VDC
PE

-X11
2
3 /85.E7
1

BUSBAR RELAY FAULTY
BUS-4 MAIN-2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
TRM
1A, 50/60Hz

-X401

BAY_412_R PHASE MYLASANDRA LINE P40#AI.01 CT: 1A	+ 1 - 2	/152.A2	BAY_435_R PHASE FUTURE BAY P40#AI.01 CT: 1A	+ 1 - 2	/154.A2
BAY_412_Y PHASE MYLASANDRA LINE P40#AI.02 CT: 1A	+ 3 - 4	/152.B2	BAY_435_Y PHASE FUTURE BAY P40#AI.02 CT: 1A	+ 3 - 4	/154.B2
BAY_412_B PHASE MYLASANDRA LINE P40#AI.03 CT: 1A	+ 5 - 6	/152.B2	BAY_435_B PHASE FUTURE BAY P40#AI.03 CT: 1A	+ 5 - 6	/154.B2
BAY_414_R PHASE FUTURE LINE P40#AI.04 CT: 1A	+ 7 - 8	/152.D2	BAY_438_R PHASE FUTURE BAY P40#AI.04 CT: 1A	+ 7 - 8	/154.D2
BAY_414_Y PHASE FUTURE LINE P40#AI.05 CT: 1A	+ 9 - 10	/152.D2	BAY_438_Y PHASE FUTURE BAY P40#AI.05 CT: 1A	+ 9 - 10	/154.D2
BAY_414_B PHASE FUTURE LINE P40#AI.06 CT: 1A	+ 11 - 12	/152.E2	BAY_438_B PHASE FUTURE BAY P40#AI.06 CT: 1A	+ 11 - 12	/154.E2
BAY_417_R PHASE BUS SECTION P40#AI.07 CT: 1A	+ 13 - 14	/153.A2	BAY_441_R PHASE FUTURE BAY P40#AI.07 CT: 1A	+ 13 - 14	/155.A2
BAY_417_Y PHASE BUS SECTION P40#AI.08 CT: 1A	+ 15 - 16	/153.B2	BAY_441_Y PHASE FUTURE BAY P40#AI.08 CT: 1A	+ 15 - 16	/155.B2
BAY_417_B PHASE BUS SECTION P40#AI.09 CT: 1A	+ 17 - 18	/153.B2	BAY_441_B PHASE FUTURE BAY P40#AI.09 CT: 1A	+ 17 - 18	/155.B2
BAY_426_R PHASE FILTER P40#AI.10 CT: 1A	+ 19 - 20	/153.D2	BAY_444_R PHASE FUTURE BAY P40#AI.10 CT: 1A	+ 19 - 20	/155.D2
BAY_426_Y PHASE FILTER P40#AI.11 CT: 1A	+ 21 - 22	/153.D2	BAY_444_Y PHASE FUTURE BAY P40#AI.11 CT: 1A	+ 21 - 22	/155.D2
BAY_426_B PHASE FILTER P40#AI.12 CT: 1A	+ 23 - 24	/153.E2	BAY_444_B PHASE FUTURE BAY P40#AI.12 CT: 1A	+ 23 - 24	/155.E2

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 166
n. sheet 167

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X31

MAIN 2 BUS 4 PROT IN	P3#BI.01	220-250VDC	1 / 2	/157.B2
MAIN 2 BUS 4 PROT OUT	P3#BI.02	220-250VDC	3 / 4	/157.B2
SPARE	P3#BI.03	220-250VDC	5 / 6	/157.C2
TRIP RELAY RESET 96B BUS-4	P3#BI.04	220-250VDC	7 / 8	/157.C2
SPARE	P3#BI.05	220-250VDC	9 / 10	/157.C2
SPARE	P3#BI.06	220-250VDC	11 / 12	/157.D2
SPARE	P3#BI.07	220-250VDC	13 / 14	/157.D2
REB670 RELAY FAULTY BUS 4 - MAIN 1	P3#BI.08	220-250VDC	15 / 16	/157.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X32

BAY412-EXT.LBB OPERATED	P3#BI.09	220-250VDC	1 / 2	/158.B2
BAY415-EXT.LBB OPERATED	P3#BI.10	220-250VDC	3 / 4	/158.B2
BAY417EXT.LBB OPERATED	P3#BI.11	220-250VDC	5 / 6	/158.C2
BAY426-EXT.LBB OPERATED	P3#BI.12	220-250VDC	7 / 8	/158.C2
BAY435-EXT.LBB OPERATED	P3#BI.13	220-250VDC	9 / 10	/158.D2
BAY438-EXT.LBB OPERATED	P3#BI.14	220-250VDC	11 / 12	/158.D2
BAY441-EXT.LBB OPERATED	P3#BI.15	220-250VDC	13 / 14	/158.E2
BAY444-EXT.LBB OPERATED	P3#BI.16	220-250VDC	15 / 16	/158.E2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X41

BUS-4 BB/LBB TRIP TO 96B	#BO.01	2 / 1	/164.B2
BUS-4 LBB TRIP RLY RESET	#BO.02	3	/164.B2
BAY-412 RPH LBB RETRIP-M2	#BO.03	5 / 4	/165.B2
BAY-412 YPH LBB RETRIP-M2	#BO.04	6	/165.B2
BAY-412 BPH LBB RETRIP-M2	#BO.05	8 / 7	/165.B2
BAY-414 RPH LBB RETRIP-M2	#BO.06	9	/165.C2
BAY-414 YPH LBB RETRIP-M2	#BO.07	11 / 10	/165.C2
BAY-414 BPH LBB RETRIP-M2	#BO.08	12	/165.C2
BAY-426 RPH LBB RETRIP-M2	#BO.09	14 / 13	/165.D2
BAY-426 YPH LBB RETRIP-M2	#BO.10	15	/165.D2
BUS-4 BB/LBB TRIP	#BO.11	17 / 16	/164.B2
BUS-4 LBB TRIP RLY RESET	#BO.12	18	/164.C2

+D.05 -D05.01

BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X42

BUSBAR-4 OPTD ANNUNCIATION CKT	#BO.13	2 / 1	/173.D3
BB-4 CT SUPVN ANNUNCIATION CKT	#BO.14	3	/173.D3
BUSBAR-4 Rph OPTD EVENT LOGGER CKT	#BO.15	5 / 4	/175.D6
BUSBAR-4 Yph OPTD EVENT LOGGER CKT	#BO.16	6	/175.E6
GENERAL TRIP	#BO.17	8 / 7	/163.A2
GENERAL TRIP	#BO.18	9	/163.B2
BB-4 MAIN-2 OPTD TO NTAMC	#BO.19	11 / 10	/163.B2
BB-4 MAIN-2 CT SUPVN BLOCK TO NTAMC	#BO.20	12	/163.C2
BB-4 MAIN-2 OPTD OUT OF SERVICE TO NTAMC	#BO.21	14 / 13	/163.C2
BB-4 MAIN-1 UNHEALTHY TO NTAMC	#BO.22	15	/163.C2
SPARE	#BO.23	17 / 16	/163.D2
SPARE	#BO.24	18	/163.D2

Rev.	Revision note	Date	Name
Based on	3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Resp. dept. PG-GAS
Doc. no. 1MNS801837-CGCA
Ref.Des. =4R
Rev. ind. 01
Language en
Sheet 167
n. sheet 168

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X61

BAY-426 BPH LBB RETRIP-M2 #BO.01	2	1	/165.D2
BAY-417 LBB RETRIP-M2 #BO.02	3		/165.E2
BAY-435 RPH LBB RETRIP-M2 #BO.03	5	4	/165.E2
BAY-435 YPH LBB RETRIP-M2 #BO.04	6		/165.E2
BAY-435 BPH LBB RETRIP-M2 #BO.05	8	7	/165.B5
BAY-438 RPH LBB RETRIP-M2 #BO.06	9		/165.B5
BAY-438 YPH LBB RETRIP-M2 #BO.07	11	10	/165.B5
BAY-438 BPH LBB RETRIP-M2 #BO.08	12		/165.C5
BAY-441 RPH LBB RETRIP-M2 #BO.09	14	13	/165.C5
BAY-441 YPH LBB RETRIP-M2 #BO.10	15		/165.C5
BAY-441 BPH LBB RETRIP-M2 #BO.11	17	16	/165.D5
BAY-444 RPH LBB RETRIP-M2 #BO.12	18		/165.D5

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BOM

-X62

BAY-444 YPH LBB RETRIP-M2 #BO.13	2	1	/165.D5
BAY-444 BPH LBB RETRIP-M2 #BO.14	3		/165.E5
BUSBAR-4 Bph OPTD EVENT LOGGER CKT #BO.15	5	4	/175.E6
BB-4 CT SUPVN EVENT LOGGER CKT #BO.16	6		/175.E6
SPARE #BO.17	8	7	
SPARE #BO.18	9		
SPARE #BO.19	11	10	
SPARE #BO.20	12		
SPARE #BO.21	14	13	
SPARE #BO.22	15		
SPARE #BO.23	17	16	
SPARE #BO.24	18		

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 168
n. sheet 169

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

+4BB8

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X51

BAY-412 RPH LBB INIT.	(FUTURE USE)	P5#BI.01	220-250VDC	+ 1 / - 2 /159.B2
BAY-412 YPH LBB INIT.	(FUTURE USE)	P5#BI.02	220-250VDC	+ 3 / - 4 /159.B2
BAY-412 BPH LBB INIT.	(FUTURE USE)	P5#BI.03	220-250VDC	+ 5 / - 6 /159.C2
BAY-412 3PH LBB INIT.	(FUTURE USE)	P5#BI.04	220-250VDC	+ 7 / - 8 /159.C2
BAY-415 RPH LBB INIT.	(FUTURE USE)	P5#BI.05	220-250VDC	+ 9 / - 10 /159.D2
BAY-415 YPH LBB INIT.	(FUTURE USE)	P5#BI.06	220-250VDC	+ 11 / - 12 /159.D2
BAY-415 BPH LBB INIT.	(FUTURE USE)	P5#BI.07	220-250VDC	+ 13 / - 14 /159.E2
BAY-415 3PH LBB INIT.	(FUTURE USE)	P5#BI.08	220-250VDC	+ 15 / - 16 /159.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X52

SPARE	(FUTURE USE)	P5#BI.09	220-250VDC	+ 1 / - 2 /160.B2
SPARE	(FUTURE USE)	P5#BI.10	220-250VDC	+ 3 / - 4 /160.B2
SPARE	(FUTURE USE)	P5#BI.11	220-250VDC	+ 5 / - 6 /160.C2
BAY-417 3PH LBB INIT.	(FUTURE USE)	P5#BI.12	220-250VDC	+ 7 / - 8 /160.C2
BAY-426 RPH LBB INIT.	(FUTURE USE)	P5#BI.13	220-250VDC	+ 9 / - 10 /160.D2
BAY-426 YPH LBB INIT.	(FUTURE USE)	P5#BI.14	220-250VDC	+ 11 / - 12 /160.D2
BAY-426 BPH LBB INIT.	(FUTURE USE)	P5#BI.15	220-250VDC	+ 13 / - 14 /160.E2
BAY-426 3PH LBB INIT.	(FUTURE USE)	P5#BI.16	220-250VDC	+ 15 / - 16 /160.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X71

BAY-435 RPH LBB INIT.	(FUTURE USE)	P7#BI.01	220-250VDC	+ 1 / - 2 /161.B2
BAY-435 YPH LBB INIT.	(FUTURE USE)	P7#BI.02	220-250VDC	+ 3 / - 4 /161.B2
BAY-435 BPH LBB INIT.	(FUTURE USE)	P7#BI.03	220-250VDC	+ 5 / - 6 /161.C2
BAY-435 3PH LBB INIT.	(FUTURE USE)	P7#BI.04	220-250VDC	+ 7 / - 8 /161.C2
BAY-438 RPH LBB INIT.	(FUTURE USE)	P7#BI.05	220-250VDC	+ 9 / - 10 /161.D2
BAY-438 YPH LBB INIT.	(FUTURE USE)	P7#BI.06	220-250VDC	+ 11 / - 12 /161.D2
BAY-438 BPH LBB INIT.	(FUTURE USE)	P7#BI.07	220-250VDC	+ 13 / - 14 /161.E2
BAY-438 3PH LBB INIT.	(FUTURE USE)	P7#BI.08	220-250VDC	+ 15 / - 16 /161.E2

+D.05 -D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4
BIM
220-250VDC

-X72

BAY-441 RPH LBB INIT.	(FUTURE USE)	P7#BI.09	220-250VDC	+ 1 / - 2 /162.B2
BAY-441 YPH LBB INIT.	(FUTURE USE)	P7#BI.10	220-250VDC	+ 3 / - 4 /162.B2
BAY-441 BPH LBB INIT.	(FUTURE USE)	P7#BI.11	220-250VDC	+ 5 / - 6 /162.C2
BAY-441 3PH LBB INIT.	(FUTURE USE)	P7#BI.12	220-250VDC	+ 7 / - 8 /162.C2
BAY-444 RPH LBB INIT.	(FUTURE USE)	P7#BI.13	220-250VDC	+ 9 / - 10 /162.D2
BAY-444 YPH LBB INIT.	(FUTURE USE)	P7#BI.14	220-250VDC	+ 11 / - 12 /162.D2
BAY-444 BPH LBB INIT.	(FUTURE USE)	P7#BI.15	220-250VDC	+ 13 / - 14 /162.E2
BAY-444 3PH LBB INIT.	(FUTURE USE)	P7#BI.16	220-250VDC	+ 15 / - 16 /162.E2

Rev.	Revision note	Date	Name
	Based on 3100135063		
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY M2-BUS 4 OVERVIEW

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 169
n. sheet 170

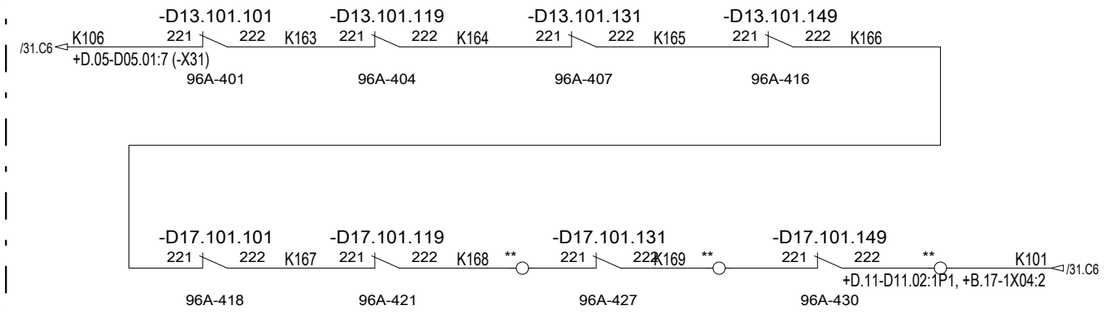
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

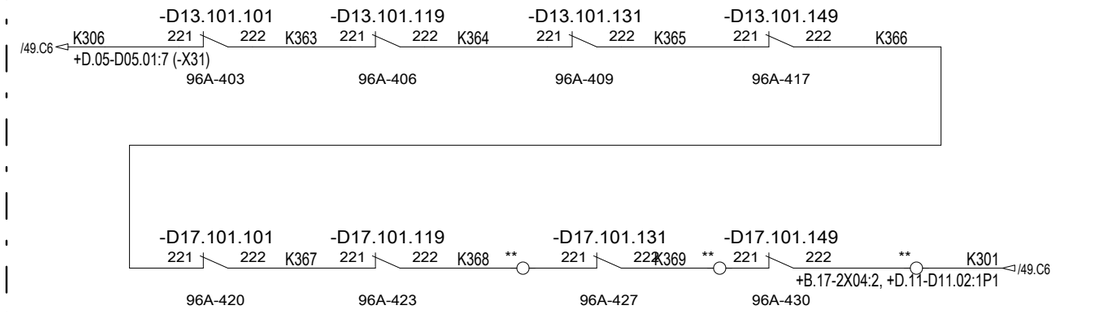
+4BB1

BUS 1 96A RESET



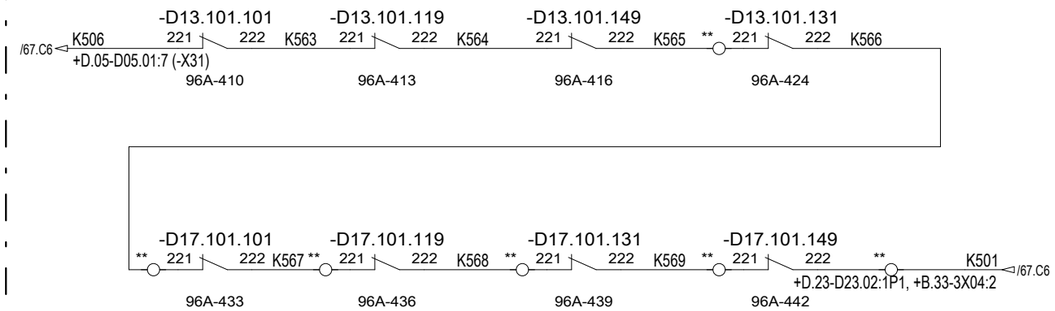
+4BB2

BUS 2 96A RESET



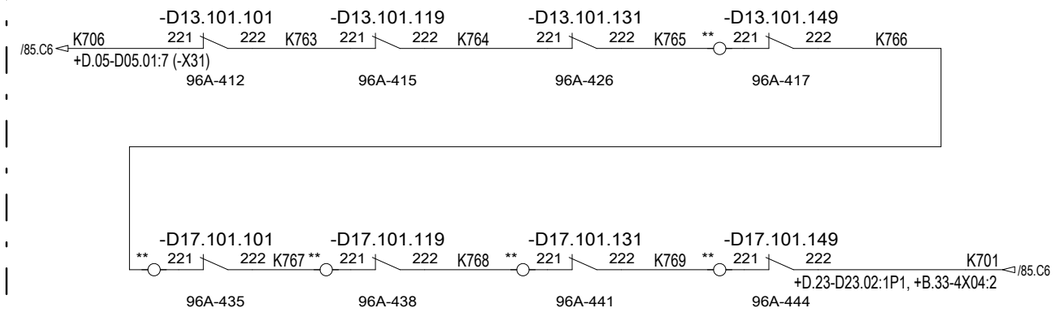
+4BB3

BUS 3 96A RESET



+4BB4

BUS 4 96A RESET



NOTE:-**TB NO's TO BE
IDENTIFIED AT SITE

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY 96A OPTD

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 170
n. sheet 171

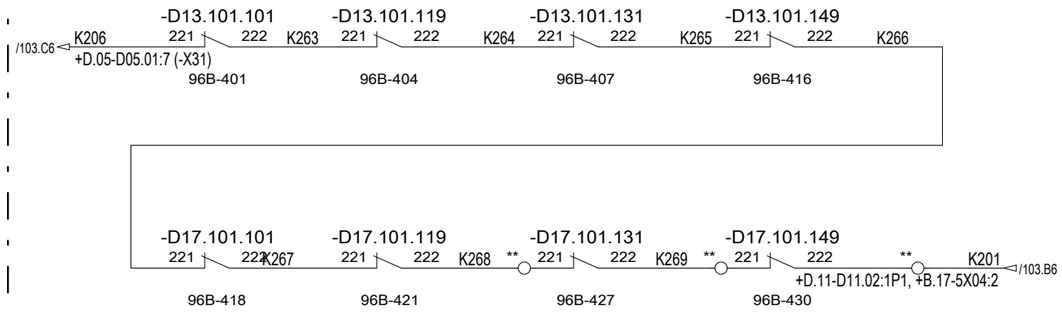
1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

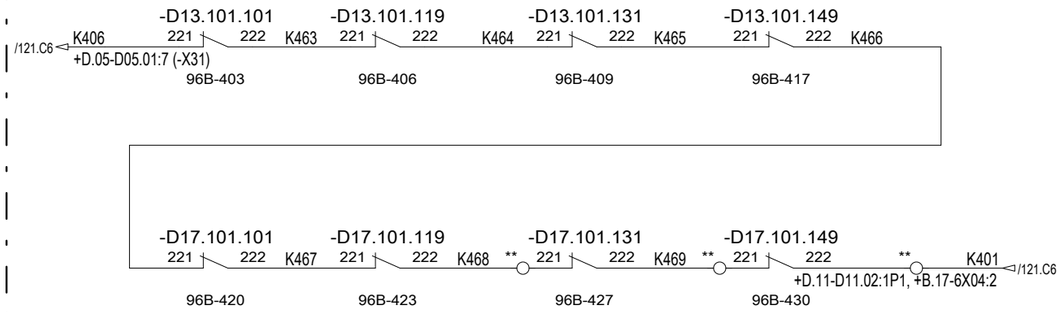
+4BB5

BUS 1 96B RESET



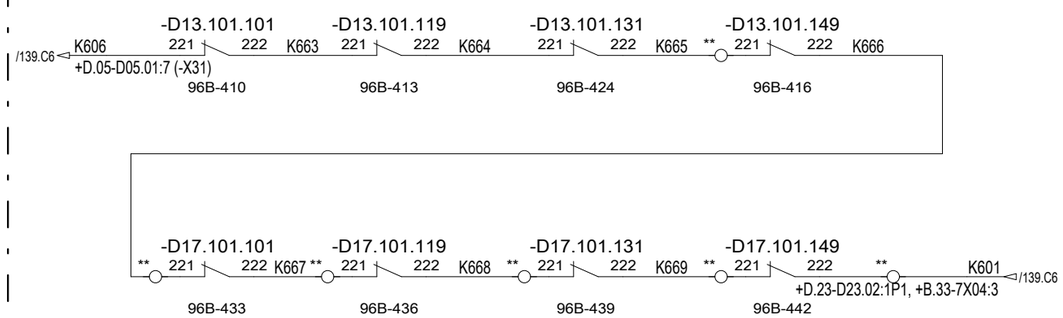
+4BB6

BUS 2 96B RESET



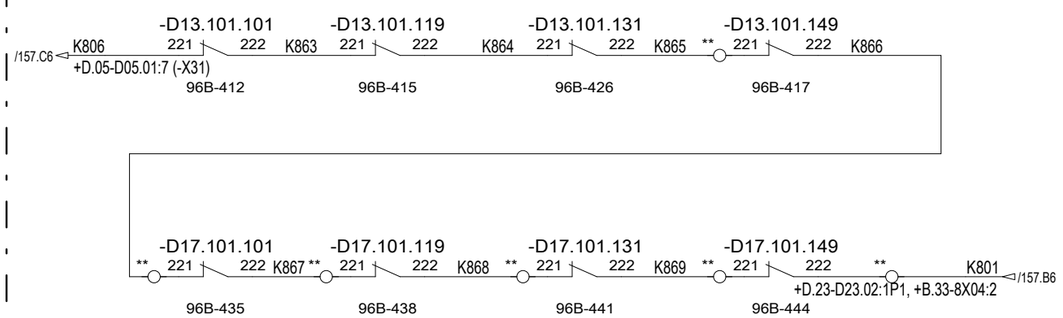
+4BB7

BUS 3 96B RESET



+4BB8

BUS 4 96B RESET



NOTE:-**TB NO's TO BE
IDENTIFIED AT SITE

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION
RETROFIT OF REB670 RELAY
96B OPTD

HITACHI Hitachi Energy India Limited

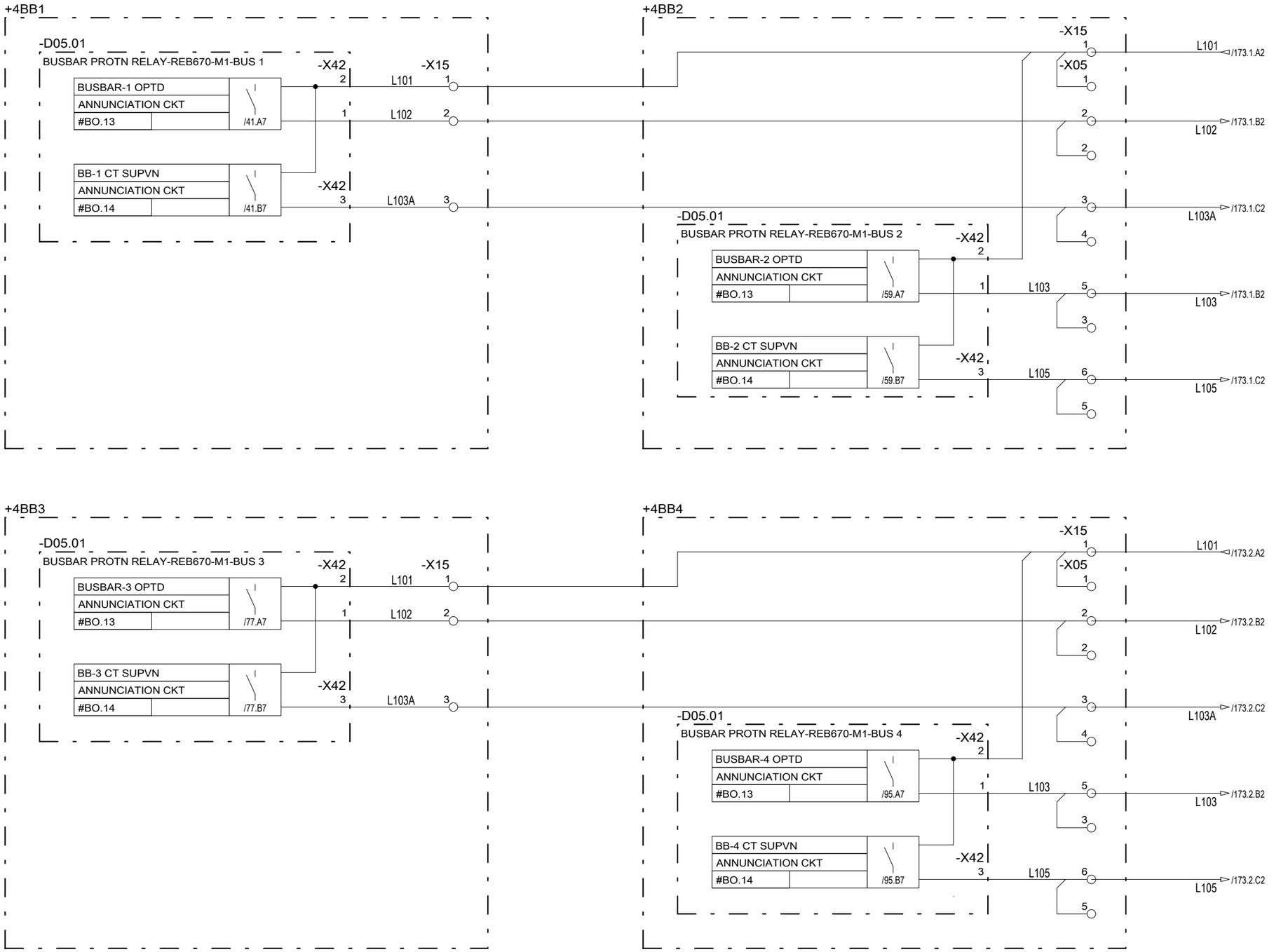
Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 171
n. sheet 172
Doc. no. 1MNS801837-CGCA

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



REFER EXISTING DWG:
YN1M300439-CZA,
SH:29_5

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

1MYN691003-102(A3)REV01

Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

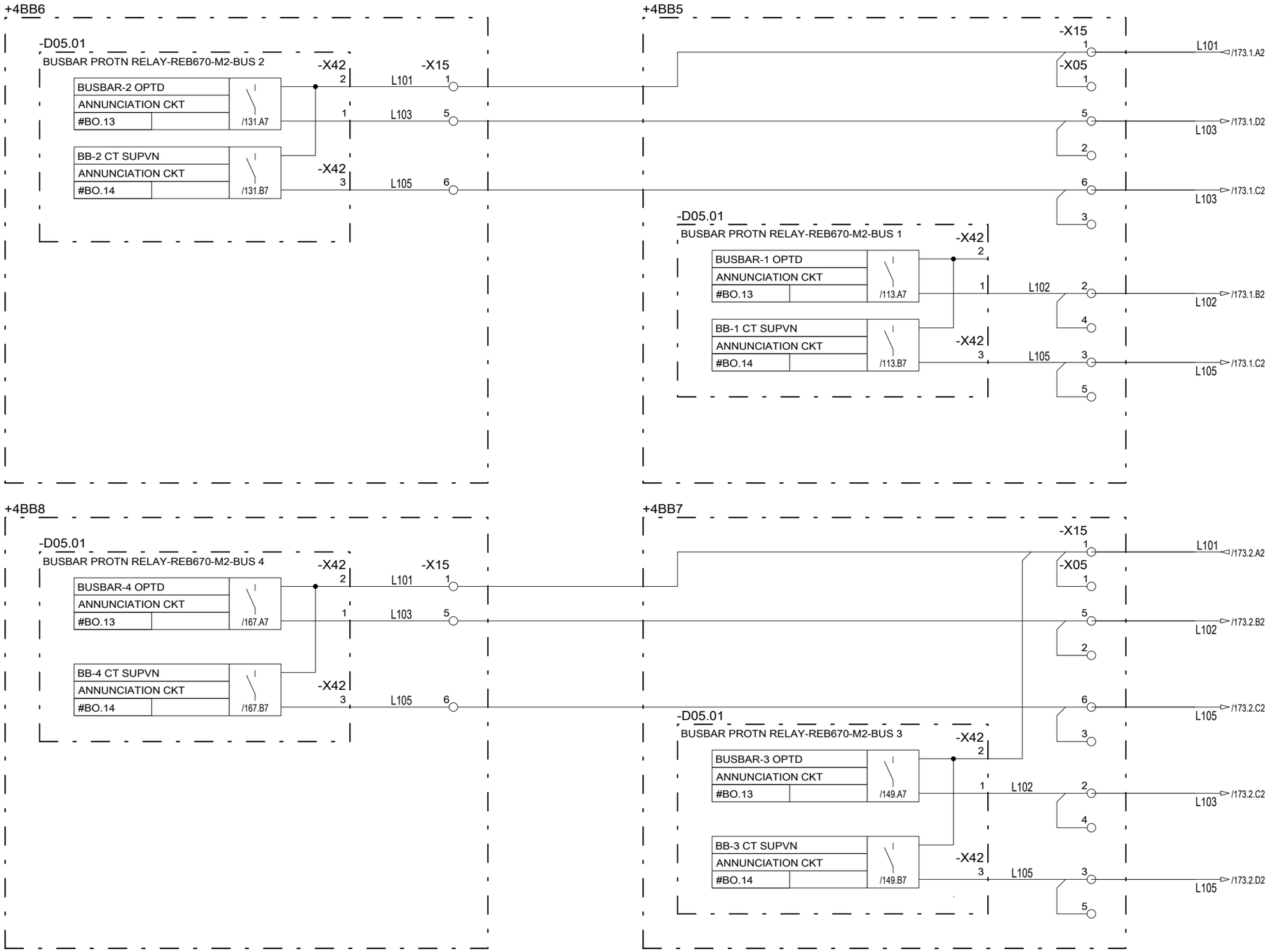
Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUCIATION CIRCUITS

HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Doc. no. 1MNS801837-CGCA
Sheet 172
n. sheet 173

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.



REFER EXISTING DWG:
YN1M300439-CZA,
SH:054_5

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title	400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUCIATION CIRCUITS		
	HITACHI Hitachi Energy India Limited		
Doc. kind.	Circuit diagram	DCC	EFS
Resp. dept.	PG-GAS	Rev. ind.	01
Ref.Des.	=4R		
Language	en		
Sheet	173		
n. sheet	173.1		
Doc. no.	1MNS801837-CGCA		

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

-4RBB1/4RBB5

+CP
CONTROL PANEL

MAIN-1

/173.1.D1 #4329 +4BB1-D01.155.101:16

/172.A7 L101 +AN — X05 — 01 — L101 — -** — +VE

/173.A7 L101 +AN +4BB5.B.17-X15:1

/173.1.E1 +4BB2-D01.155.101:16 L104

/172.A7 L102 A — 02 — L102 — ** — BUS-1 MAIN-I/II B/B PROTN OPTD

/173.B7 +4BB5.B.17-X15:2 A L102

/172.B7 L103 B — 03 — L103 — ** — BUS-2 MAIN-I/II B/B PROTN OPTD

/173.B7 +4BB5.B.17-X15:6 B L103

/172.B7 L103A C — 04 — L103A — ** — BUS-1 MAIN-I/II CT SUPVN RELAY OPTD

/173.B7 +4BB5.B.17-X15:3 C L105

/172.C7 L105 D — 05 — L105 — ** — BUS-2 MAIN-I/II CT SUPVN RELAY OPTD

/173.A7 +4BB5.B.17-X15:5 D L103

/173.1.A2 #4329 -D01.155.101 16 17 -D01.155.101 16 17 — 06 — L104 — ** — BUS-1 MAIN-I/II BUS-2 MAIN-I/II BB PROTN. DC FAIL

/173.1.B2 L104 -D01.155.101 16 17 -D01.155.101 16 17 — 07 — ** — BUS-1/2 MAIN-II BB PROTN. DC FAIL

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

1MYN691003-102(A3)REV01

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

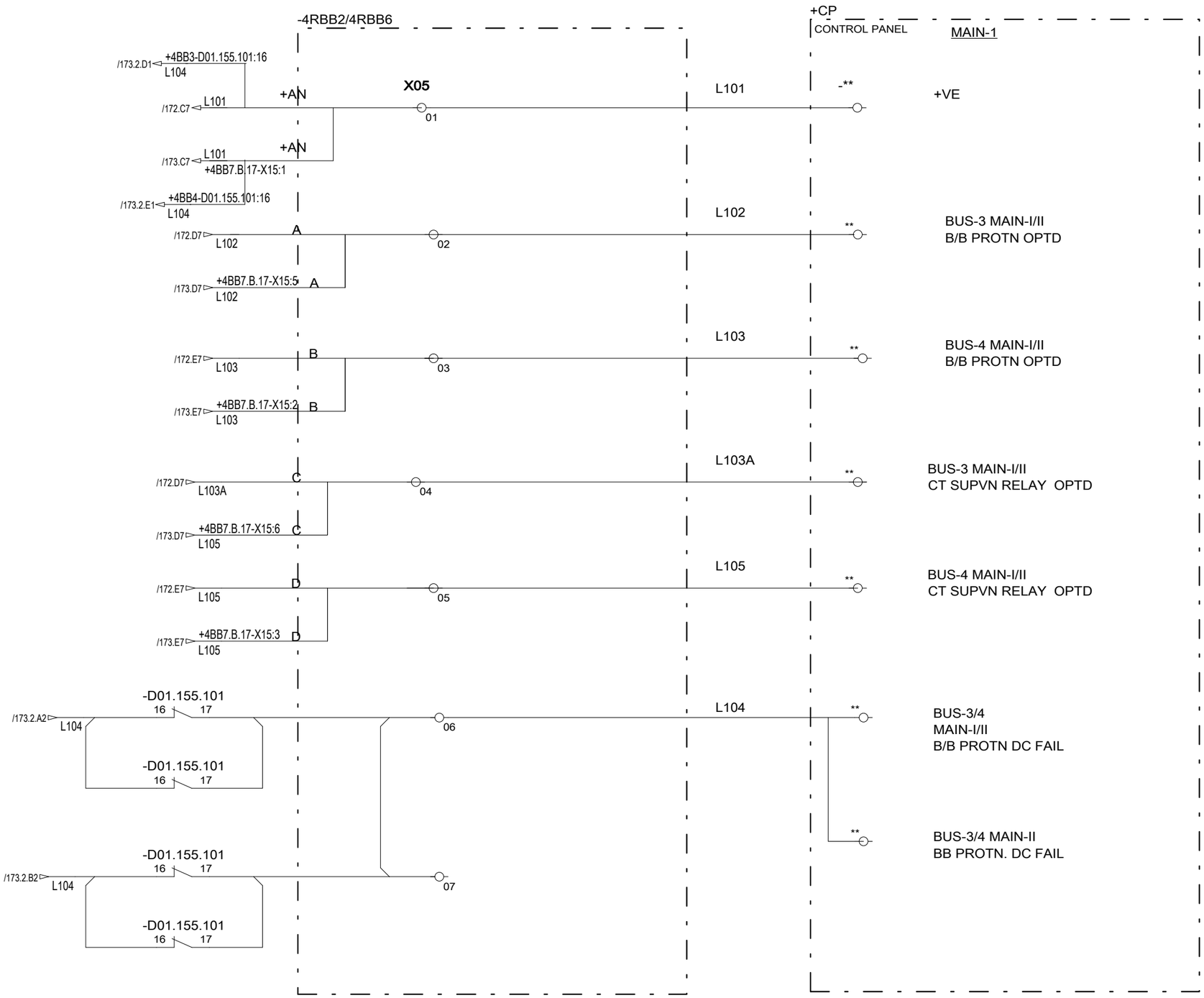
Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUNCIATOR CIRCUIT

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
DCC	EFS		
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	173.1
		n. sheet	173.2

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.



Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title	400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY ANNUNCIATOR CIRCUIT		
HITACHI	Hitachi Energy India Limited		
Doc. kind.	Circuit diagram	DCC EFS	
Resp. dept.	PG-GAS	Rev. ind. 01	Language en
Doc. no.	1MNS801837-CGCA	Sheet	173.2
		n. sheet	174
Ref.Des.	=4R		

1MYN691003-102(A3)REV01

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB1

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 1

BUSBAR-1 Rph OPTD	I	/41.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-1 Yph OPTD	I	/41.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-1 Bph OPTD	I	/42.E2
EVENT LOGGER CKT		
#BO.11		
BB-1 CT SUPVN	I	/42.E2
EVENT LOGGER CKT		
#BO.12		

-X16 1 → -X6 1 → ** **MAIN-1**

-X42 5 → L301 → 1 → ** BUSBAR-1 Rph. PROTN OPTD

-X42 4 → L302 → 2 → ** BUSBAR-1 Yph. PROTN OPTD

-X42 6 → L303 → 3 → ** BUSBAR-1 Bph. PROTN OPTD

-X61 17 → L304 → 4 → ** BUSBAR-1 CT SUPVN. RELAY OPTD

-X61 16 → L305 → 5 → ** BUSBAR-1 PROTN. OPTD.DC SUPPLY FAIL

-X61 18 → L306 → -D01.155.101 26 27 → 6 → ** BUSBAR-1 PROTN. OPTD.TRIP RELAY OPTD

L307 → -D01.143.301 26 27 → 7

+4BB2

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 2

BUSBAR-2 Rph OPTD	I	/59.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-2 Yph OPTD	I	/59.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-2 Bph OPTD	I	/60.B4
EVENT LOGGER CKT		
#BO.15		
BB-2 CT SUPVN	I	/60.C4
EVENT LOGGER CKT		
#BO.16		

-X16 1 → L301 → -X06 1 → ** **MAIN-1**

-X42 5 → L308 → 2 → ** BUSBAR-2 Rph. PROTN OPTD

-X42 6 → L309 → 3 → ** BUSBAR- 2 Yph. PROTN OPTD

X62 5 → L310 → 4 → ** BUSBAR-2 Bph. PROTN OPTD

X62 6 → L311 → 5 → ** BUSBAR-2 CT SUPVN. RELAY OPTD

-D01.155.101 26 27 L306 → 6 → ** BUSBAR-2 PROTN. OPTD.DC SUPPLY FAIL

-D01.143.301 26 27 L307 → 7 → ** BUSBAR-2 PROTN. OPTD.TRIP RELAY OPTD

REFER EXISTING DWG YN1M300439-CZA, SH:30

+4BB3

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 3

BUSBAR-3 Rph OPTD	I	/77.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-3 Yph OPTD	I	/77.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-3 Bph OPTD	I	/78.B4
EVENT LOGGER CKT		
#BO.15		
BB-3 CT SUPVN	I	/78.B4
EVENT LOGGER CKT		
#BO.16		

-X16 1 → -X6 1 → ** **MAIN-1**

-X42 5 → L301 → 1 → ** BUSBAR-3 Rph. PROTN OPTD

-X42 4 → L302 → 2 → ** BUSBAR-3 Yph. PROTN OPTD

-X42 6 → L303 → 3 → ** BUSBAR-3 Bph. PROTN OPTD

-X62 5 → L304 → 4 → ** BUSBAR-3 CT SUPVN. RELAY OPTD

-X62 6 → L305 → 5 → ** BUSBAR-3 PROTN. OPTD.DC SUPPLY FAIL

-D01.155.101 26 27 L306 → 6 → ** BUSBAR-3 PROTN. OPTD.TRIP RELAY OPTD

L307 → -D01.143.301 26 27 → 7

+4BB4

-D05.01
BUSBAR PROTN RELAY-REB670-M1-BUS 4

BUSBAR-4 Rph OPTD	I	/95.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-4 Yph OPTD	I	/95.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-4 Bph OPTD	I	/96.B4
EVENT LOGGER CKT		
#BO.15		
BB-4 CT SUPVN	I	/96.B4
EVENT LOGGER CKT		
#BO.16		

-X16 1 → L301 → -X06 1 → ** **MAIN-1**

-X42 5 → L308 → 2 → ** BUSBAR-4 Rph. PROTN OPTD

-X42 6 → L309 → 3 → ** BUSBAR- 4 Yph. PROTN OPTD

-X62 5 → L310 → 4 → ** BUSBAR-4 Bph. PROTN OPTD

-X62 6 → L311 → 5 → ** BUSBAR-4 CT SUPVN. RELAY OPTD

-D01.155.101 26 27 L306 → 6 → ** BUSBAR-4 PROTN. OPTD.DC SUPPLY FAIL

-D01.143.301 26 27 L307 → 7 → ** BUSBAR-4 PROTN. OPTD.TRIP RELAY OPTD

Based on 3100135063			
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR
Rev.	Revision note	Date	Name

Prepared	18.04.2023	PANKAJ PATIL
Approved	20.04.2023	DEENADAYALAN A
Project	POWER GRID CORPORATION OF INDIA LTD. 400/220kV KOLAR SUBSTATION 3100137898	

Title: 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY EVENT LOGGER CIRCUIT

HITACHI Hitachi Energy India Limited

Doc. kind.	Circuit diagram	Ref.Des.	=4R
	DCC EFS		
Resp. dept.	PG-GAS	Rev. ind.	01
Language	en		
Sheet	174		
Doc. no.	1MNS801837-CGCA	n. sheet	175

1MYN691003-102(A3)REV01

© 2023 Hitachi Energy. All rights reserved.

The reproduction, distribution and utilization of this document as well as the communication of its contents to others without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

+4BB5

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 1

BUSBAR-1 Rph OPTD	I	/113.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-1 Yph OPTD	I	/113.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-1 Bph OPTD	I	/114.E2
EVENT LOGGER CKT		
#BO.11		
BB-1 CT SUPVN	I	/114.E2
EVENT LOGGER CKT		
#BO.12		

-X42 5 L301 → +EL -X16 1 → -X06 1 **
-X42 4 L302 → +EL -X16 2 → -X06 2 ** BUSBAR-1 Rph. PROTN OPTD
-X42 6 L303 → +EL -X16 3 → -X06 3 ** BUSBAR-1 Yph. PROTN OPTD
-X61 17 / 16 L304 → +EL -X16 4 → -X06 4 ** BUSBAR-1 Bph. PROTN OPTD
-X61 18 L305 → +EL -X16 5 → -X06 5 ** BUSBAR-1 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → +EL -X16 6 → -X06 6 ** BUSBAR-1 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → +EL -X16 7 → -X06 7 ** BUSBAR-1 PROTN. OPTD.TRIP RELAY OPTD

MAIN-2

+4BB6

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 2

BUSBAR-2 Rph OPTD	I	/131.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-2 Yph OPTD	I	/131.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-2 Bph OPTD	I	/132.A4
EVENT LOGGER CKT		
#BO.13		
BB-2 CT SUPVN	I	/132.B4
EVENT LOGGER CKT		
#BO.14		

-X16 1 L301 → -X06 1 **
-X42 5 → -X16 1 L301 → -X06 1 ** MAIN-2
-X42 4 L308 → -X16 2 → -X06 2 ** BUSBAR-2 Rph. PROTN OPTD
-X42 6 L309 → -X16 3 → -X06 3 ** BUSBAR-2 Yph. PROTN OPTD
X62 2 / 1 L310 → -X16 4 → -X06 4 ** BUSBAR-2 Bph. PROTN OPTD
X62 3 L311 → -X16 5 → -X06 5 ** BUSBAR-2 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → -X16 6 → -X06 6 ** BUSBAR-2 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → -X16 7 → -X06 7 ** BUSBAR-2 PROTN. OPTD.TRIP RELAY OPTD

REFER EXISTING DWG
YN1M300439-CZA,
SH:55

+4BB7

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 3

BUSBAR-3 Rph OPTD	I	/149.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-3 Yph OPTD	I	/149.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-3 Bph OPTD	I	/150.B4
EVENT LOGGER CKT		
#BO.15		
BB-3 CT SUPVN	I	/150.B4
EVENT LOGGER CKT		
#BO.16		

-X16 2 → -X06 1 **
-X42 5 L301 → -X16 2 → -X06 1 ** MAIN-2
-X42 4 L302 → -X16 2 → -X06 2 ** BUSBAR-3 Rph. PROTN OPTD
-X42 6 L303 → -X16 3 → -X06 3 ** BUSBAR-3 Yph. PROTN OPTD
-X62 5 / 4 L304 → -X16 4 → -X06 4 ** BUSBAR-3 Bph. PROTN OPTD
-X62 6 L305 → -X16 5 → -X06 5 ** BUSBAR-3 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → -X16 6 → -X06 6 ** BUSBAR-2 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → -X16 7 → -X06 7 ** BUSBAR-2 PROTN. OPTD.TRIP RELAY OPTD

+4BB8

-D05.01
BUSBAR PROTN RELAY-REB670-M2-BUS 4

BUSBAR-4 Rph OPTD	I	/167.B7
EVENT LOGGER CKT		
#BO.15		
BUSBAR-4 Yph OPTD	I	/167.C7
EVENT LOGGER CKT		
#BO.16		
BUSBAR-4 Bph OPTD	I	/168.B4
EVENT LOGGER CKT		
#BO.15		
BB-4 CT SUPVN	I	/168.B4
EVENT LOGGER CKT		
#BO.16		

-X16 1 L301 → -X06 1 **
-X42 5 → -X16 1 L301 → -X06 1 ** MAIN-2
-X42 4 L308 → -X16 2 → -X06 2 ** BUSBAR-4 Rph. PROTN OPTD
-X42 6 L309 → -X16 3 → -X06 3 ** BUSBAR-4 Yph. PROTN OPTD
-X62 5 / 4 L310 → -X16 4 → -X06 4 ** BUSBAR-4 Bph. PROTN OPTD
-X62 6 L311 → -X16 5 → -X06 5 ** BUSBAR-4 CT SUPVN. RELAY OPTD
-D01.155.101 26 27 L306 → -X16 6 → -X06 6 ** BUSBAR-4 PROTN. OPTD.DC SUPPLY FAIL
-D01.143.301 26 27 L307 → -X16 7 → -X06 7 ** BUSBAR-4 PROTN. OPTD.TRIP RELAY OPTD

Rev.	Revision note	Date	Name
01	REVISED AS PER CUSTOMER COMMENTS	02.10.2024	DUR

Based on 3100135063

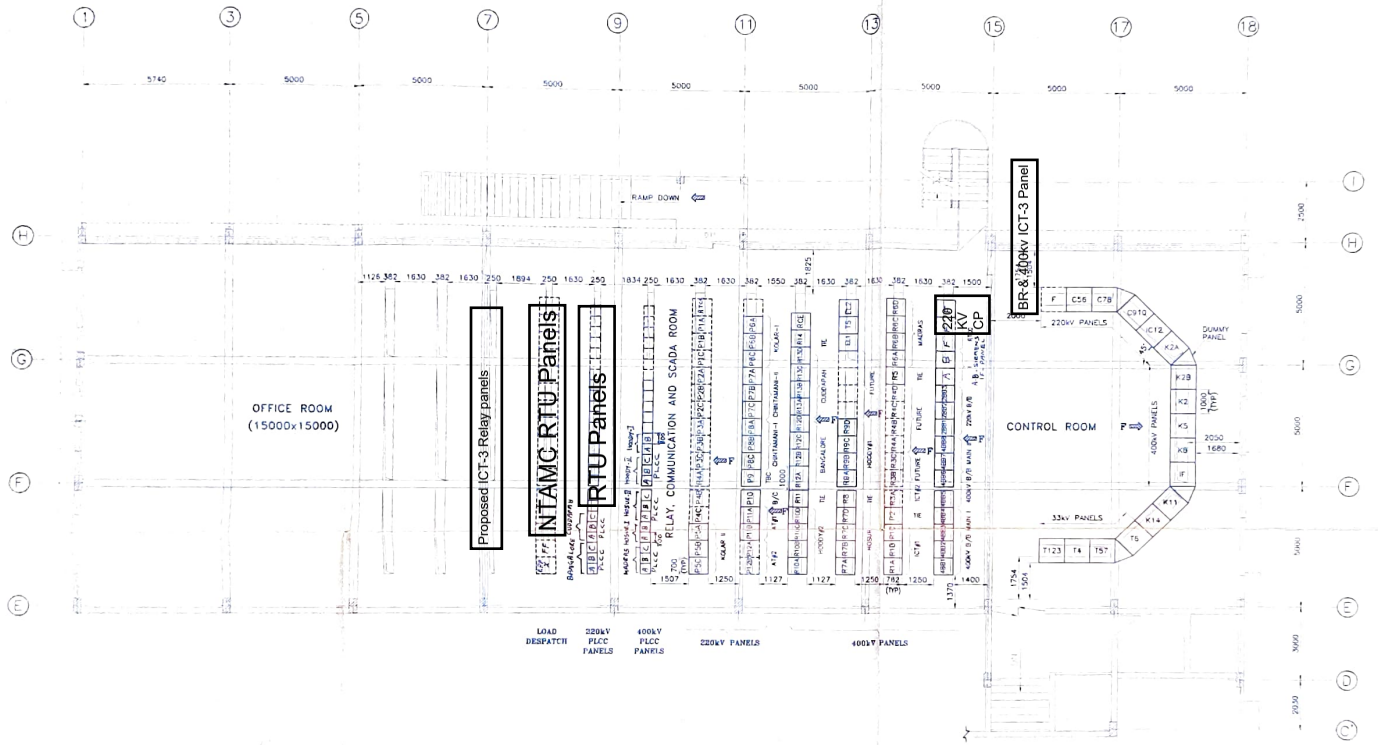
Prepared 18.04.2023 PANKAJ PATIL
Approved 20.04.2023 DEENADAYALAN A
Project POWER GRID CORPORATION OF INDIA LTD.
400/220kV KOLAR SUBSTATION
3100137898

Title 400kV BUSBAR PROTECTION RETROFIT OF REB670 RELAY EVENT LOGGER CIRCUIT

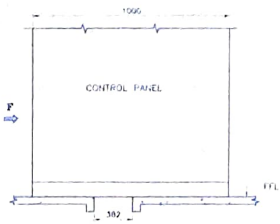
HITACHI Hitachi Energy India Limited

Doc. kind. Circuit diagram
DCC EFS
Ref.Des. =4R
Resp. dept. PG-GAS
Rev. ind. 01
Language en
Sheet 175
n. sheet
Doc. no. 1MNS801837-CGCA

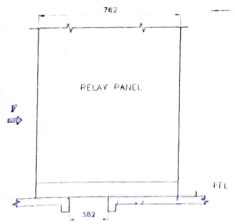
1MYN691003-102(A3)REV01



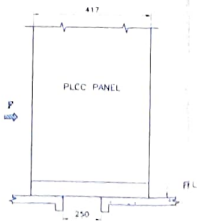
MEZZANINE FLOOR PLAN



TYPICAL MOUNTING DETAIL OF CONTROL PANEL
(NTS)



TYPICAL MOUNTING DETAIL OF RELAY PANEL
(NTS)



TYPICAL MOUNTING DETAIL OF PLCC PANEL
(NTS)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. PANEL DESIGNATION SHALL BE AS PER LEGEND GIVEN BELOW.

LEGEND:-

400kV LINE PROTECTION (4 PANELS) FOR 6TH BAY SIMILARLY FOR OTHERS

- P6A – MAIN-1 & OVER VOLTAGE
- P6B – MAIN-2
- P6C – DISTURBANCE RECORDER
- P6D – CB AUX, A/R & LBB

400kV AT#1 PROTECTION (3 PANELS)

- P1A – HV DIFF. PROTECTION & BACKUP PROTECTION
- P1B – TRANSFORMER REF & AUX. PROTECTION
- P1C – CB AUX & LBB

220kV SIDE AT#1 PROTECTION (2 PANELS)

- P11A – V/F, BACKUP PROTECTION
- P11B – CB AUX & LBB

220kV LINE PROTECTION (1 PANELS) FOR 7TH BAY SIMILARLY FOR OTHERS

- P7A – MAIN-1 & DISTURBANCE RECORDER
- P7B – MAIN-2
- P7C – CB AUX, A/R & LBB

400kV BUS BAR PROTECTION (3 PANELS)

- 4881 TO 4884 – MAIN-I FOR BUS I,II,III & IV RESPECTIVELY
- 4885 TO 4888 – MAIN-II FOR BUS I,II,III & IV RESPECTIVELY

220kV BUS BAR PROTECTION (1 PANELS)

- 2881 TO 2883 – BUS BAR PROTECTION FOR BUS I & II

MISCELLANEOUS PANELS

- EL1 – 400kV E/L
- EL2 – 220kV E/L
- TS – TIME SYNCHRONISING
- RCE – 400kV VOLTAGE & FREQUENCY RECORDERS FOR BUS I,II,III & IV.
- RTCC – REMOTE TAP CHANGER
- I – SIEMENS INTERFACE PANEL (2 Nos)
- FP – FIRE ALARM PANEL

400kV CONTROL PANELS

- K2A, K2B, K2 – CONTROL PANEL FOR BAY 1,2/3 (AT#1-TIE-AT#2 (F))
- K5 – CONTROL PANEL FOR BAY 4/5/6 (FUTURE-TIE-MADRAS)
- K8 – CONTROL PANEL FOR BAY 7/8/9 (HOSUR-TIE-HOODY-I)
- K11 – CONTROL PANEL FOR BAY 10/11/12 (HOODY-II-TIE-BANGALORE)
- K14 – CONTROL PANEL FOR BAY 13/14/15 (CUDDAPAH-TIE-FUTURE)
- IF – INTERFACE PANEL (BUS SECTIONALISER BETWEEN BUS I,II & II,IV)

220kV CONTROL PANELS

- C56 – CONTROL PANEL FOR BAY 5/6 (KOLAR-II & KOLAR-I)
- C78 – CONTROL PANEL FOR BAY 7/8 (CHINTAMANI-II & CHINTAMANI-I)
- C910 – CONTROL PANEL FOR BAY 9,10 (TBC & SC)
- IC12 – CONTROL PANEL FOR BAY 11/12 (K#1 & K#2)
- F – FUTURE

33kV CONTROL AND RELAY PANELS

- T123 – CONTROL & RELAY PANEL FOR BAY 1/2/3 (AUX TRAFO, HVDC#1 & HVDC#2)
- T4 – CONTROL & RELAY PANEL FOR BAY 4 (TERTIARY OF AT)
- T57 – CONTROL & RELAY PANEL FOR BAY 5/7 (HVDC#2 & BUS SECTION)
- T6 – CONTROL & RELAY PANEL FOR BAY 6 (SEB FDR & 5MVA TRAFO)

REFERENCE DRAWINGS:-

SL.No.	DRAWING No.	TITLE
1.	CG/973/502	CONTROL ROOM BUILDING MEZZANINE FLOOR PLAN
2.	CG/973/001	SINGLE LINE DIAGRAM OF 400/220/33kV KOLAR S/S
3.	CG/973/002	PROTECTION SINGLE LINE DIAGRAM OF 400/220/33kV S/S

AS BUILT

REV. No.	DESCRIPTION	APPROVD	DATE
R6	AS BUILT		27.11.2002
R5	EVENT LOGGER PANELS RELOCATED		28.02.2002
R4	REVISED BASED ON PGCIL COMMENTS DATED 08/02/2002		14.02.2002
R3	DRAWING REVISED		04.02.2002
R2	REVISED BASED ON PGCIL COMMENTS DATED 02/02/2001 AND IN LINE WITH CIVIL CONSTRUCTION DRAWING		31.03.2001
R1	REVISED BASED ON DISCUSSIONS WITH PGCIL ON 11/01/2001		23.01.2001

PROJECT: EAST-SOUTH INTERCONNECTOR-II
400/220/33kV KOLAR S/S (PKG. A)

CONTRACT No:

TITLE: EQUIPMENT LAYOUT OF CONTROL ROOM BUILDING -MEZZANINE FLOOR PLAN

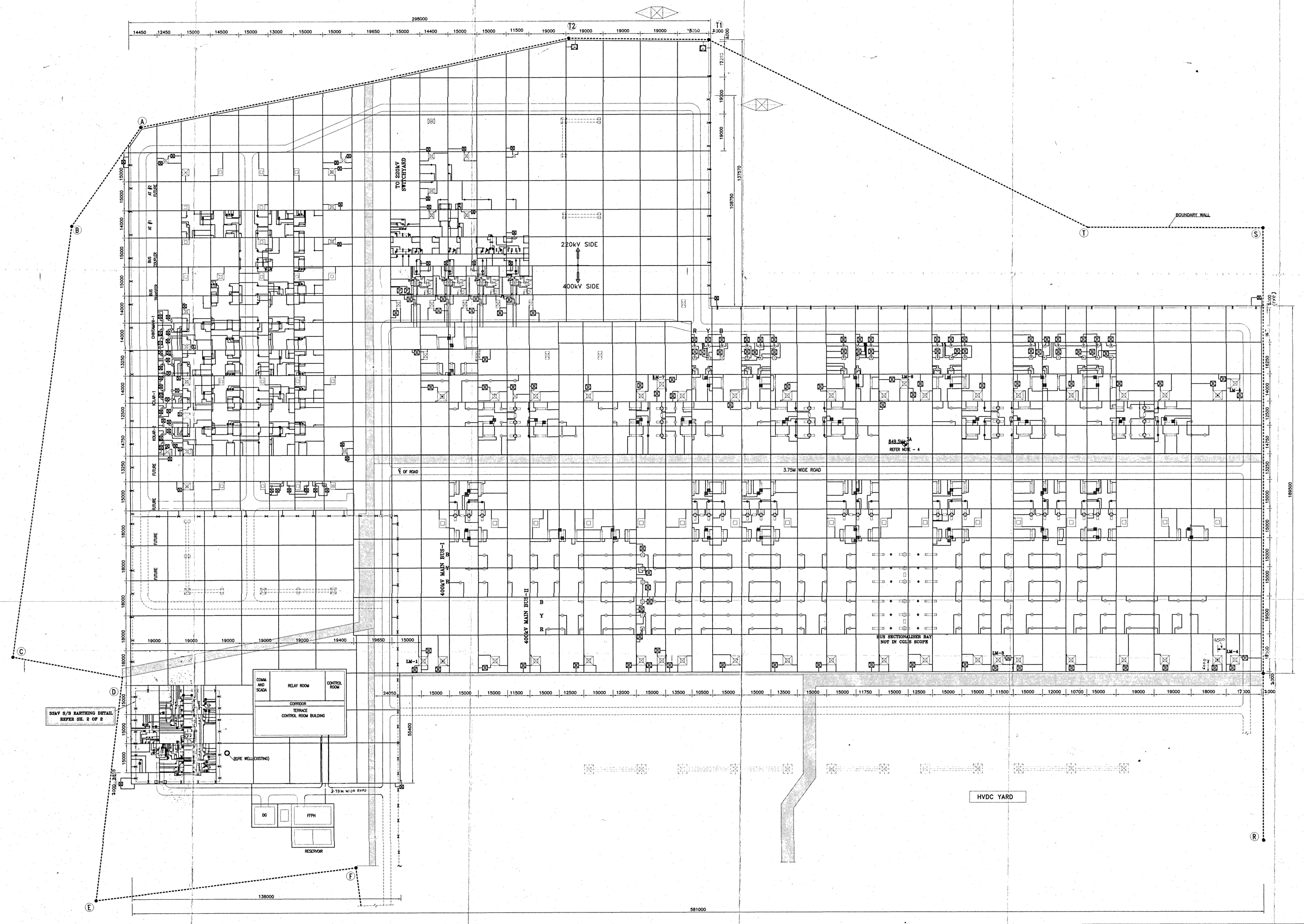
Crompton Greaves
ENGINEERING PROJECTS DIVISION - CHENNAI

CUSTOMER: POWER GRID CORPORATION OF INDIA LTD.
(A GOVERNMENT OF INDIA ENTERPRISE)

DRAWN	S.NATRAJ	DATE	30.10.2000
CHECKED		SCALE	1:100
APPROVED			
PASSED		SHEET No.	1 OF 1

DRG. No. CG/973/101 REV. R6

AT#2 BAY(F)	FUTURE		MADRAS	HOSUR	HOODY-1	HOODY-2	BANGALORE	CUDDAPAH		FUTURE



NOTES:

1. EARTHING CONNECTIONS OF EQUIPMENTS SHOWN ARE DIAGRAMATIC ONLY. EXACT LOCATIONS OF EQUIPMENTS EARTHING CONNECTION LEADS, EARTH ELECTRODES MAY BE CHANGED TO SUIT SITE CONDITIONS.
2. EARTHING LEADS FROM EQUIPMENTS / STRUCTURES SHALL BE CONNECTED TO DIFFERENT CONDUCTORS OF MAIN EARTHING GRID.
3. DEPTH OF LAYING OF MAIN EARTHING CONDUCTOR SHALL BE 800mm BELOW THE FINISHED GROUND LEVEL.
4. EARTHING CONNECTIONS WITH EQUIPMENT EARTHING PADS SHALL BE BOLTED TYPE AND BELOW GROUND LEVEL CONNECTIONS SHALL BE WELDED TYPE. FOR RUST PROTECTIONS WELDS SHOULD BE TREATED WITH RED LEAD & AFTERWARDS COATED WITH BITUMEN COMPOUND TO PREVENT CORROSION.
5. ALL BELOW GROUND LEVEL CONNECTIONS SHALL BE ELECTRIC ARC WELDING. ALL WELDED JOINTS SHALL BE ALLOWED TO COOL DOWN GRADUALLY TO ATMOSPHERIC TEMPERATURE BEFORE PUTTING ANY LOAD ON IT.
6. WHEREVER EARTHING CONDUCTORS CROSSES CABLE TRENCHES, PIPES, ETC., IT SHALL BE LAID 300mm BELOW THEM AND SHALL BE REROUTED IN CASE IT FOULS WITH EQUIPMENT STRUCTURE FOUNDATION.
7. EARTHING CONDUCTOR CROSSING THE ROAD SHALL BE LAID 300mm BELOW ROAD.
8. AUXILIARY EARTH MAT SIZE 1.5m x 1.5m SHALL BE LAID BELOW THE MAIN SWITCH & EARTH SWITCH OPERATING HANDLES OF ISOLATORS AT A DEPTH OF 300mm BELOW THE FINISHED GROUND LEVEL.
9. AUX. EARTHMAT FOR ISOLATOR OPERATING MECHANISM SHOWN ARE INDICATIVE ONLY EXACT LOCATION SHALL BE AS PER REFERENCE DRAWINGS BELOW.
10. THE EARTHING OF INDIVIDUAL EQUIPMENTS / TOWERS / LMs SHALL BE DONE AS PER THE APPROVED EARTHING DETAIL DRAWING.
11. ALTERNATE FENCE POST SHALL BE CONNECTED TO EARTH MAT.
12. DISTANCES SHOWN FOR EARTHING RODS MAY BE ALTERED TO SUIT SITE CONDITIONS HOWEVER THE SPACING SHALL NOT EXCEED 20M AND THE TOTAL NO. OF RODS (LONGITUDINAL AND TRANSVERSE DIRECTION) SHALL BE MAINTAINED AS SHOWN.

LEGEND:

- MAIN EARTHING & RISER CONDUCTOR (40mm ø MS ROD)
- AUXILIARY EARTH MAT (40mm ø MS ROD)
- ROD EARTH ELECTRODE
- PIPE EARTH ELECTRODE

REFERENCE DRAWINGS

Sl.No.	DRAWING DESCRIPTION	DRAWING No.
1	GENERAL ARRANGEMENT OF 400/220/33kV KOLAR SUBSTATION	CG/973/005
2	400/220/33kV KOLAR SUBSTATION LAYOUT – PLAN	CG/973/003
3	400/220/33kV KOLAR SUBSTATION LAYOUT – SECTIONS	CG/973/004
4	GENERAL NOTES ON EARTHING	CG/973/009
5	RISER DETAILS	CG/973/010
6	DETAIL OF LAP AND CROSS JOINTS	CG/973/011
7	DETAIL OF AUXILIARY EARTH MAT FOR ISOLATOR	CG/973/012
8	DETAIL OF PIPE EARTH ELECTRODE	CG/973/013
9	DETAILS OF ROD ELECTRODE	CG/973/014
10	EARTHING DETAIL OF 167MVA AUTO TRAFO.	CG/973/015
11	EARTHING DETAIL OF 400kV CIRCUIT BREAKER	CG/973/016
12	EARTHING DETAIL OF 400kV ISOLATOR WITH DOUBLE EARTH SWITCH	CG/973/017
13	EARTHING DETAIL OF 400kV ISOLATOR WITH SINGLE EARTH SWITCH	CG/973/018
14	EARTHING DETAIL OF 400kV CURRENT TRANSFORMER	CG/973/019
15	EARTHING DETAIL OF 400kV CAP. VOLTAGE TRANSFORMER	CG/973/020
16	EARTHING DETAIL OF 396kV LIGHTNING ARRESTER	CG/973/021
17	EARTHING DETAIL OF 400kV WAVE TRAP	CG/973/022
18	EARTHING DETAIL OF 400kV BUS PT INSULATOR	CG/973/023
19	EARTHING DETAIL OF 220kV CIRCUIT BREAKER	CG/973/024
20	EARTHING DETAIL OF 220kV ISOLATOR WITH SINGLE EARTH SWITCH	CG/973/025
21	EARTHING DETAIL OF 220kV ISOLATOR WITH DOUBLE EARTH SWITCH	CG/973/026
22	EARTHING DETAIL OF 220kV TWIDDA ISOLATOR	CG/973/027
23	EARTHING DETAIL OF 220kV CURRENT TRANSFORMER	CG/973/028
24	EARTHING DETAIL OF 220kV CAP. VOLTAGE TRANSFORMER	CG/973/029
25	EARTHING DETAIL OF 216kV LIGHTNING ARRESTER	CG/973/030
26	EARTHING DETAIL OF 220kV WAVE TRAP	CG/973/031
27	EARTHING DETAIL OF 220kV BUS PT INSULATOR	CG/973/032
28	EARTHING DETAIL OF LIGHTING CUM LIGHTNING	CG/973/033
29	EARTHING DETAIL OF TOWER WITH PEAK	CG/973/034
30	EARTHING DETAIL OF TOWER WITHOUT PEAK	CG/973/035
31	EARTHING DETAIL OF BAY MARSHALING KIOSK	CG/973/036
32	EARTHING DETAIL OF CABLE TRENCH	CG/973/038
33	EARTHING DETAIL OF GATE & FENCE	CG/973/039
34	EARTHING DETAIL OF 1000/630MVA TRANSFORMER	CG/973/040
35	EARTHING DETAIL OF 33kV CIRCUIT BREAKER	CG/973/041
36	EARTHING DETAIL OF 33kV ISO. WITH ONE E/S	CG/973/042
37	EARTHING DETAIL OF 33kV ISO. WITH TWO E/S	CG/973/043
38	EARTHING DETAIL OF 33kV CT	CG/973/044
39	EARTHING DETAIL OF 33kV PT	CG/973/045
40	EARTHING DETAIL OF 33kV HORN GAP FUSE	CG/973/046
41	EARTHING DETAIL OF 33kV LIGHTNING ARRESTER	CG/973/047
42	EARTHING DETAIL OF 33kV BUS POST INSULATOR	CG/973/048
43	EARTHING DETAIL OF STREET LIGHTING POLE	CG/973/049

AS BUILT

PROJECT: EAST-SOUTH INTERCONNECTOR-II
400/220/33kV KOLAR S/S (PKG. A)

CONTRACT No:

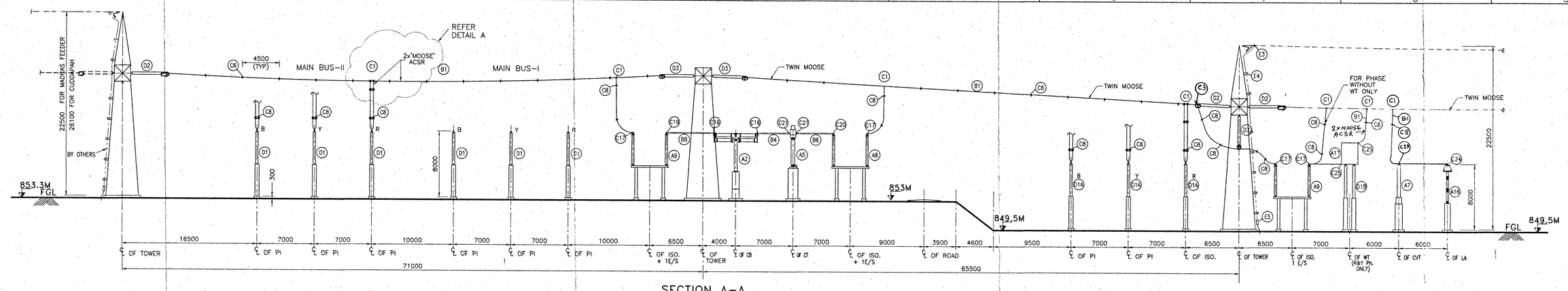
TITLE: EARTHING LAYOUT

Crompton Greaves
ENGINEERING PROJECTS DIVISION – CHENNAI

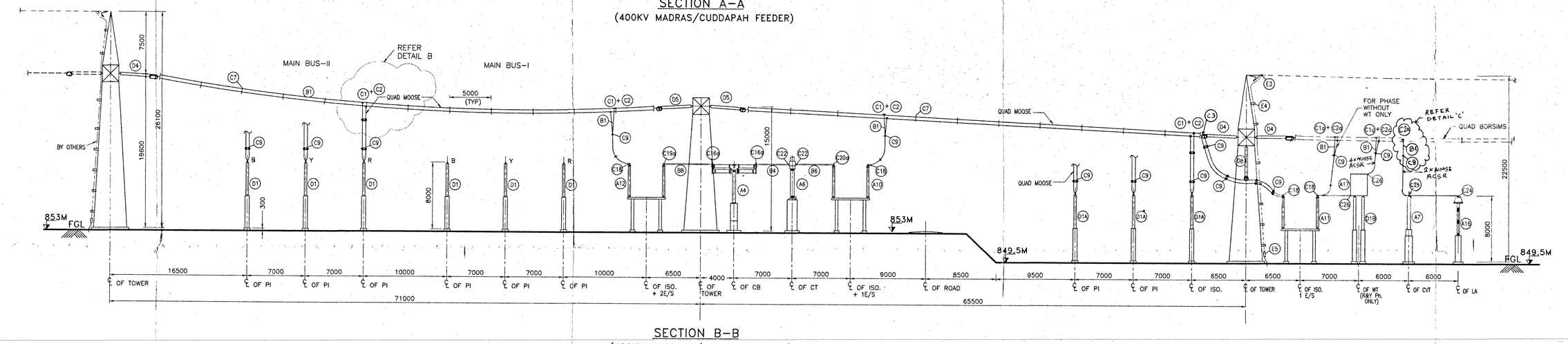
CUSTOMER: POWER GRID CORPORATION OF INDIA LTD.,
(A GOVERNMENT OF INDIA ENTERPRISE)

			DRAWN	S.NATRAJ	DATE	29.12.2000
			CHECKED		SCALE	1:700
R2	AS BUILT	02.01.2003	APPROVED			
R1	REVISED BASED ON PGCIL COMMENTS DATED 11.01.2001	03.04.2001	PASSED		SHEET No.	1 OF 2
		APPROVED	DRG. No.	CG/973/007	REV.	R2

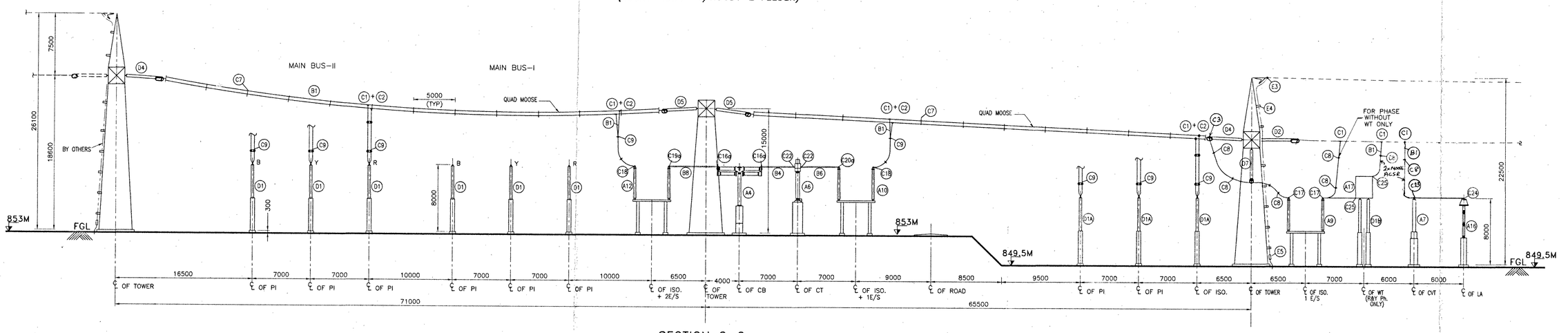
1189 X 841 - A0 CAD FILE/LOC :- HD2B/C/PGCIL/EXCEL/973/R1/973EAR.DWG



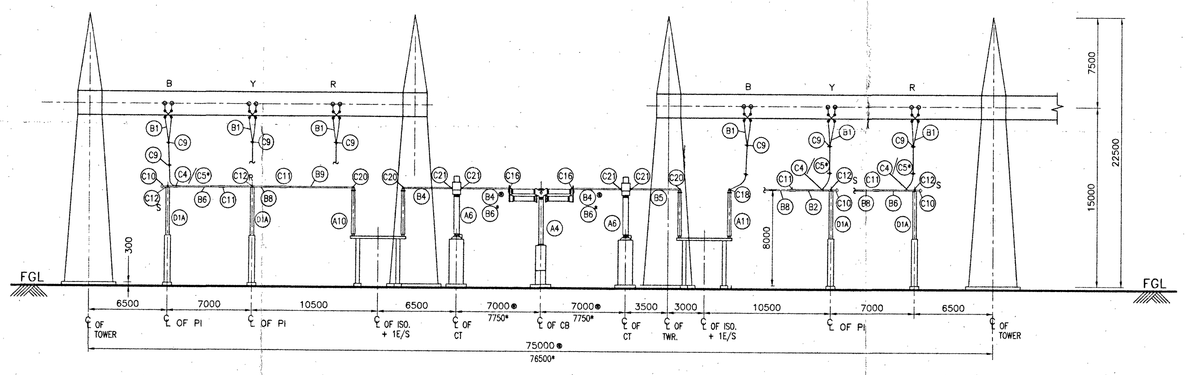
SECTION A-A
(400KV MADRAS/CUDDAPAH FEEDER)



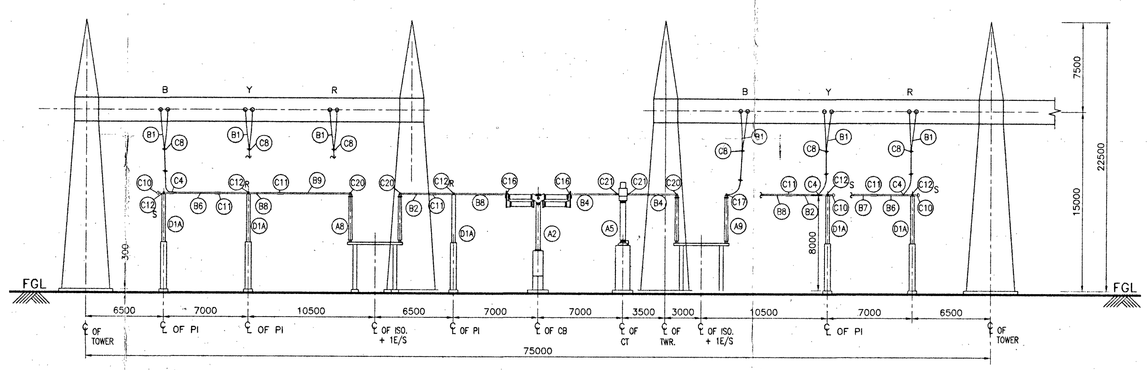
SECTION B-B
(400KV HOODY-1/HOODY-2 FEEDER)



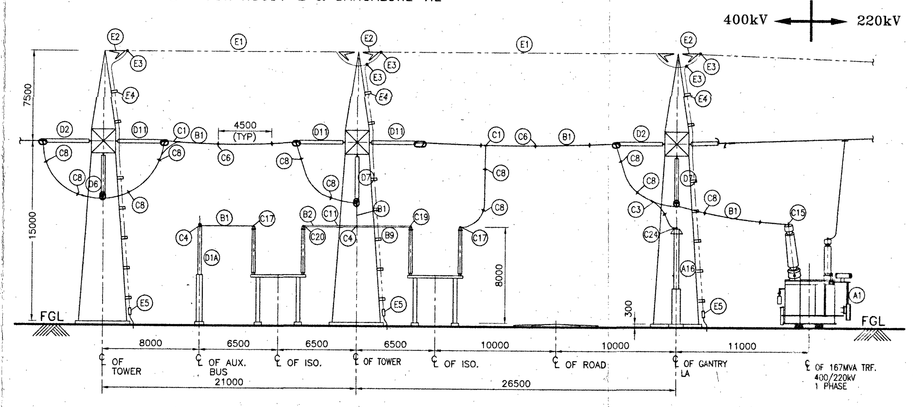
SECTION C-C
(400KV HOSUR/BANGALORE FEEDER)



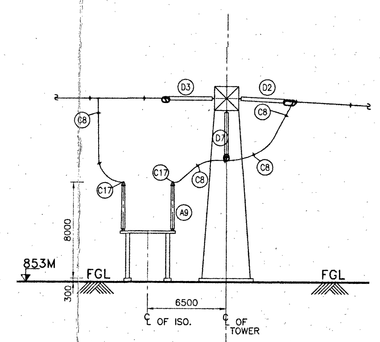
SECTION D-D
(400KV BUS TIE - 4 x 'MOOSE' ACSR)
* - FOR HOSUR & HOODY-1 TIE
⊙ - FOR HOODY-2 & BANGALORE TIE



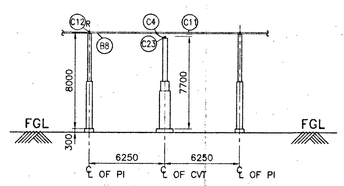
SECTION E-E
(400KV BUS TIE - 2 x 'MOOSE' ACSR)



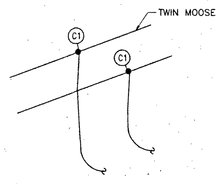
SECTION F-F
(400/220KV AUTO TRANSFORMER#1)



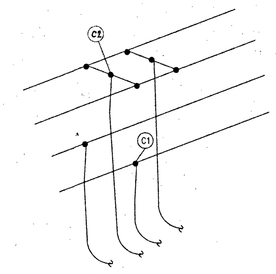
SECTION G-G



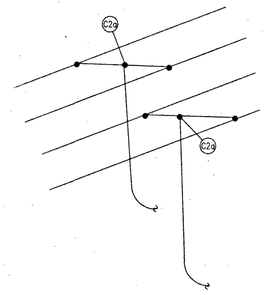
SECTION H-H
BUS CVT



TWIN TO TWIN CONNECTION
DETAIL A



QUAD TO QUAD CONNECTION
DETAIL B



QUAD TO TWIN CONNECTION
DETAIL C

NOTE:-

1. FOR NOTE & LEGEND REFER SHEET 1

AS BUILT

PROJECT: EAST-SOUTH INTERCONNECTOR-II 400/220/33kV KOLAR S/S (PKG.A)

CONTRACT No.:

TITLE: ERECTION KEY DIAGRAM 400kV SWITCHYARD

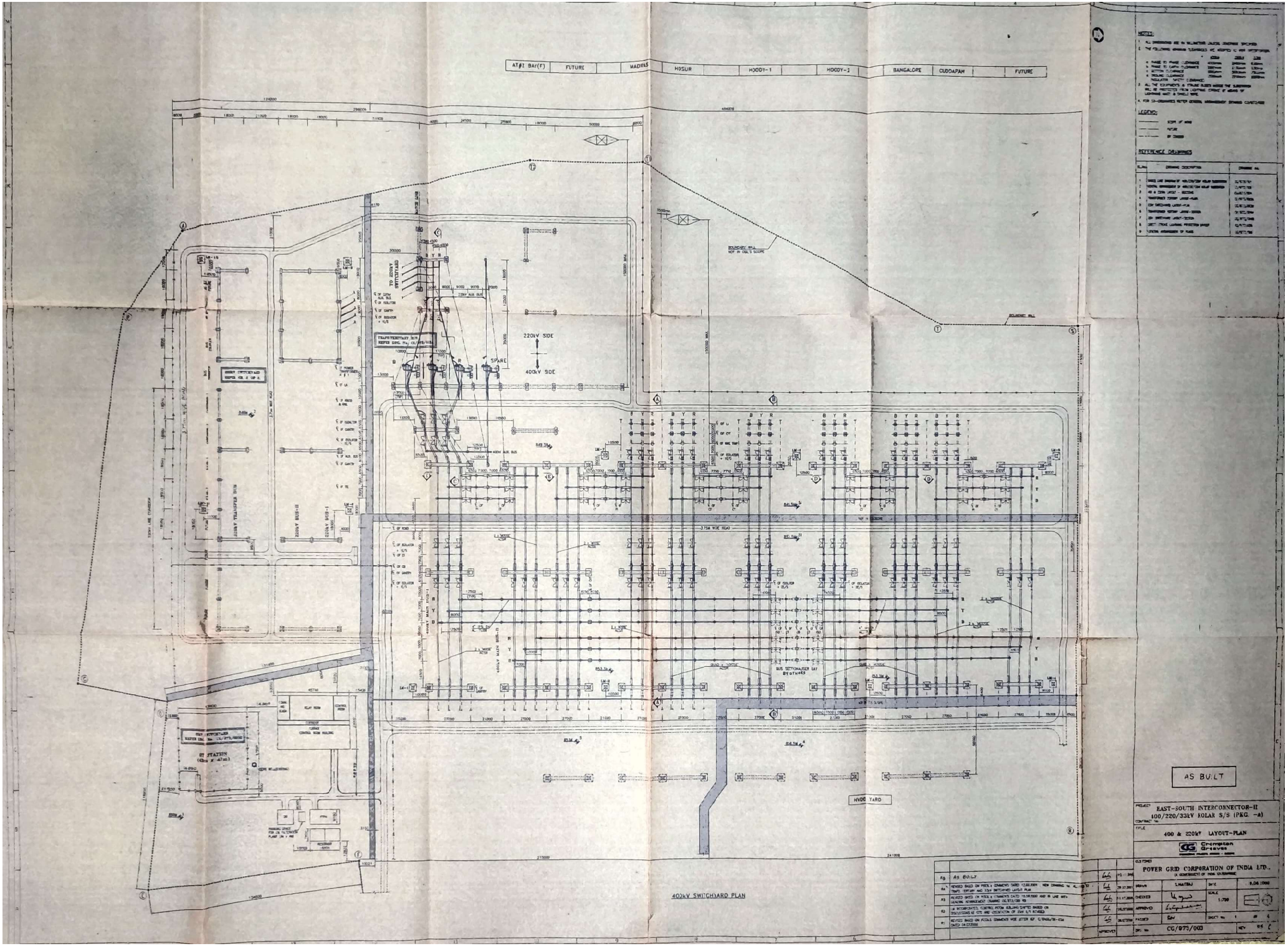
Crompton Greaves
ENGINEERING PROJECTS DIVISION - CHENNAI

CUSTOMER: POWER GRID CORPORATION OF INDIA LTD.,
(A GOVERNMENT OF INDIA ENTERPRISE)

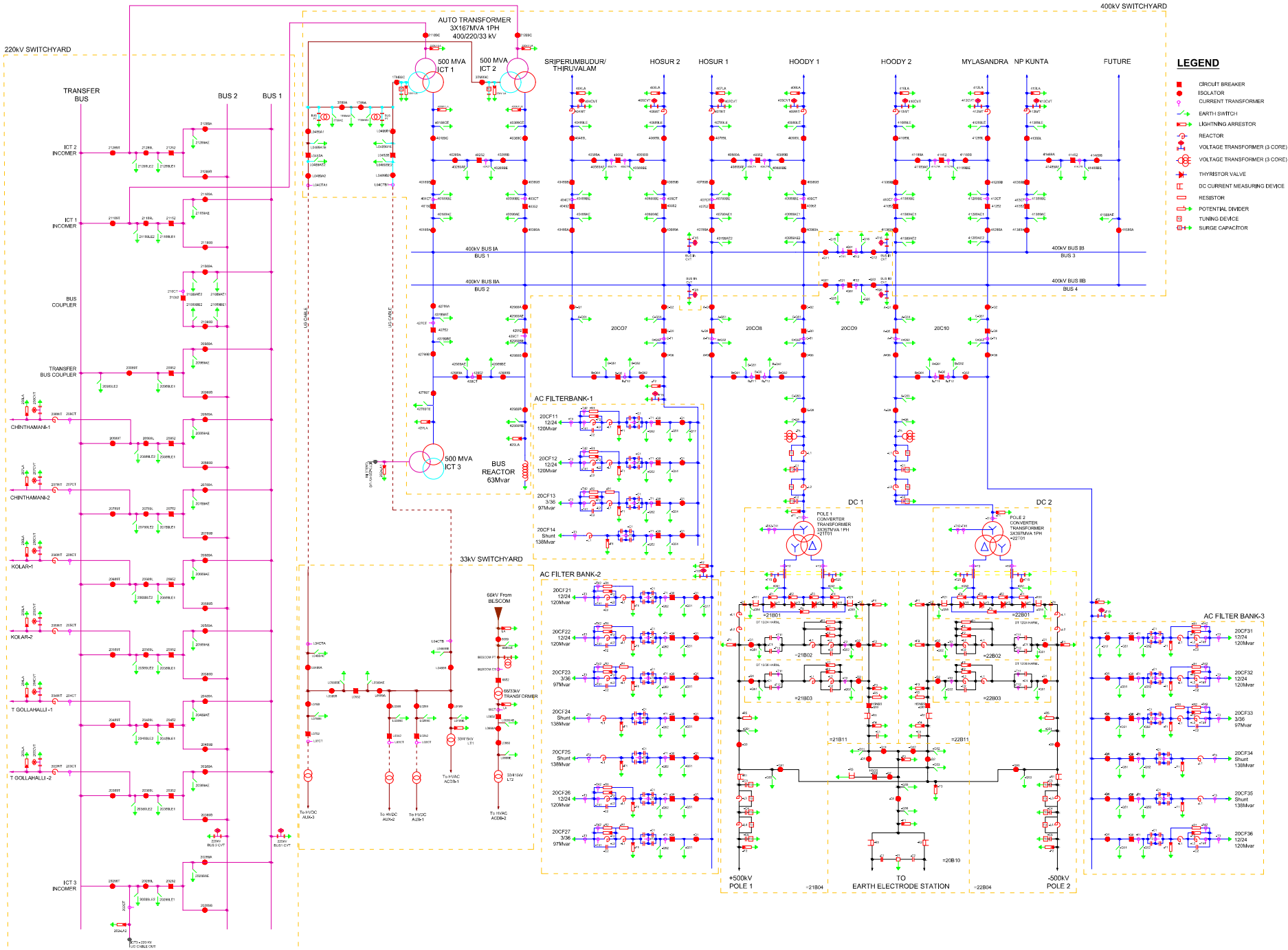
REV. No.	DESCRIPTION	APPROVED	DATE
R3	AS BUILT		02.01.2003
R2	REVISED BASED ON PGCIL'S COMMENTS DATED 19.07.01		17.08.2001
R1	REVISED BASED ON PGCIL'S COMMENTS DATED 15.06.2001		30.06.2001

DRAWN: K.MANIMEKALAI — DATE: 21.02.2001
CHECKED — SCALE: 1:250
APPROVED — SHEET No. 2 OF 2
PASSED
DRG. No. CG/973/072 — REV. R3

1188 X 841 - A0 CAD FILE/LOC. :- HD-28/D/PGCIL/EXCEL/400KV/R2/973EK0728.DWG


AT#1 BAY(F)
FUTURE
MADRAS
HOSUR
HOODY-1
HOODY-2
BANGALORE
CUDDAPAH
FUTURE
220kV SIDE
400kV SIDE
SPARE
400kV SWITCHYARD PLAN
HVDC YARD
AS BUILT
EAST-SOUTH INTERCONNECTOR-II
400/220/33kV KOLAR S/S (P&G. -A)
400 & 220kV LAYOUT-PLAN
POWER GRID CORPORATION OF INDIA LTD.
CG/973/003

POWERGRID CORPORATION OF INDIA LIMITED
2500 MW, ±500kV HVDC TERMINAL & 400/220kV HVAC STATION KOLAR

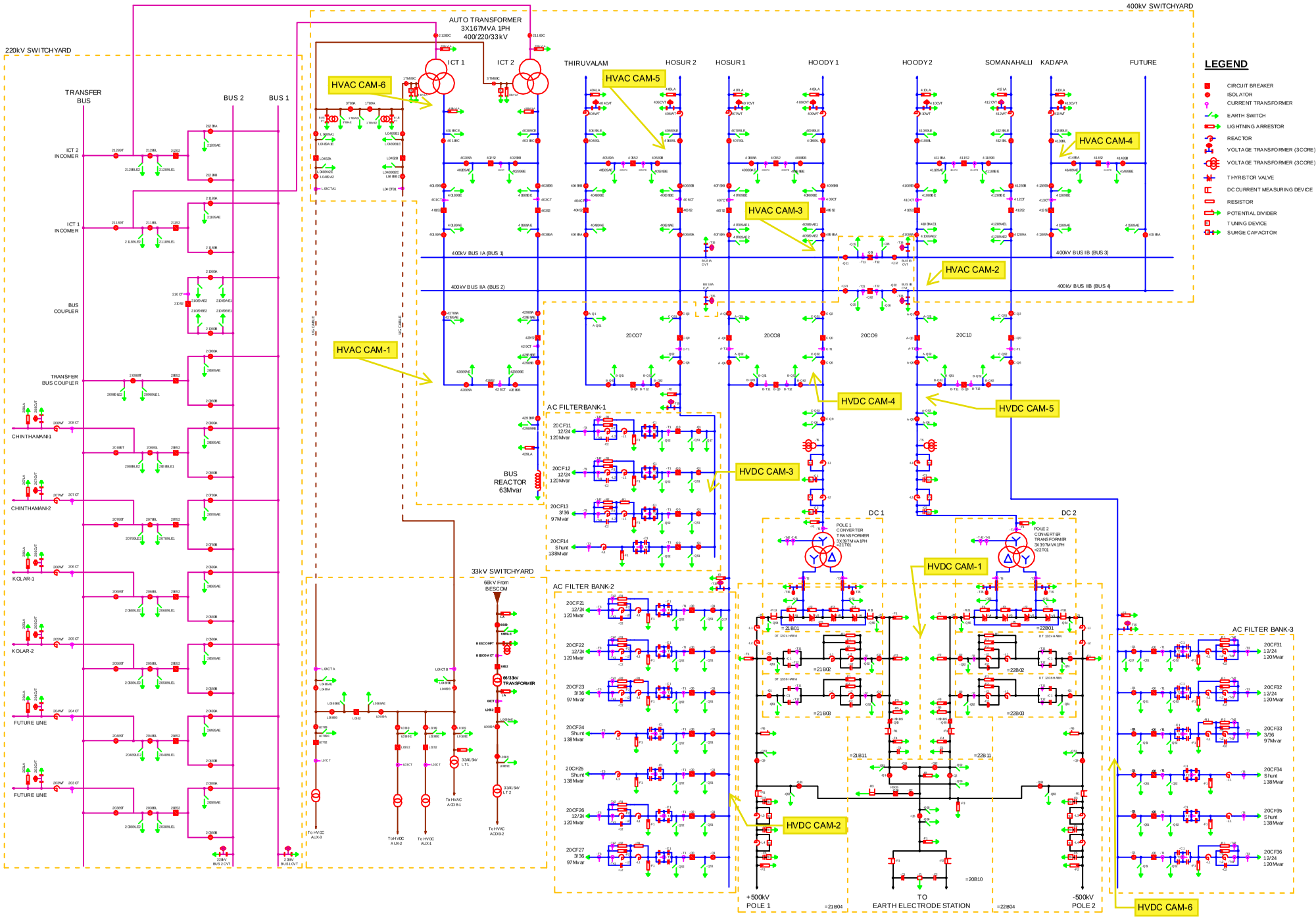


drwng No: PGCIL/kolar/(

POWERGRID CORPORATION OF INDIA LIMITED

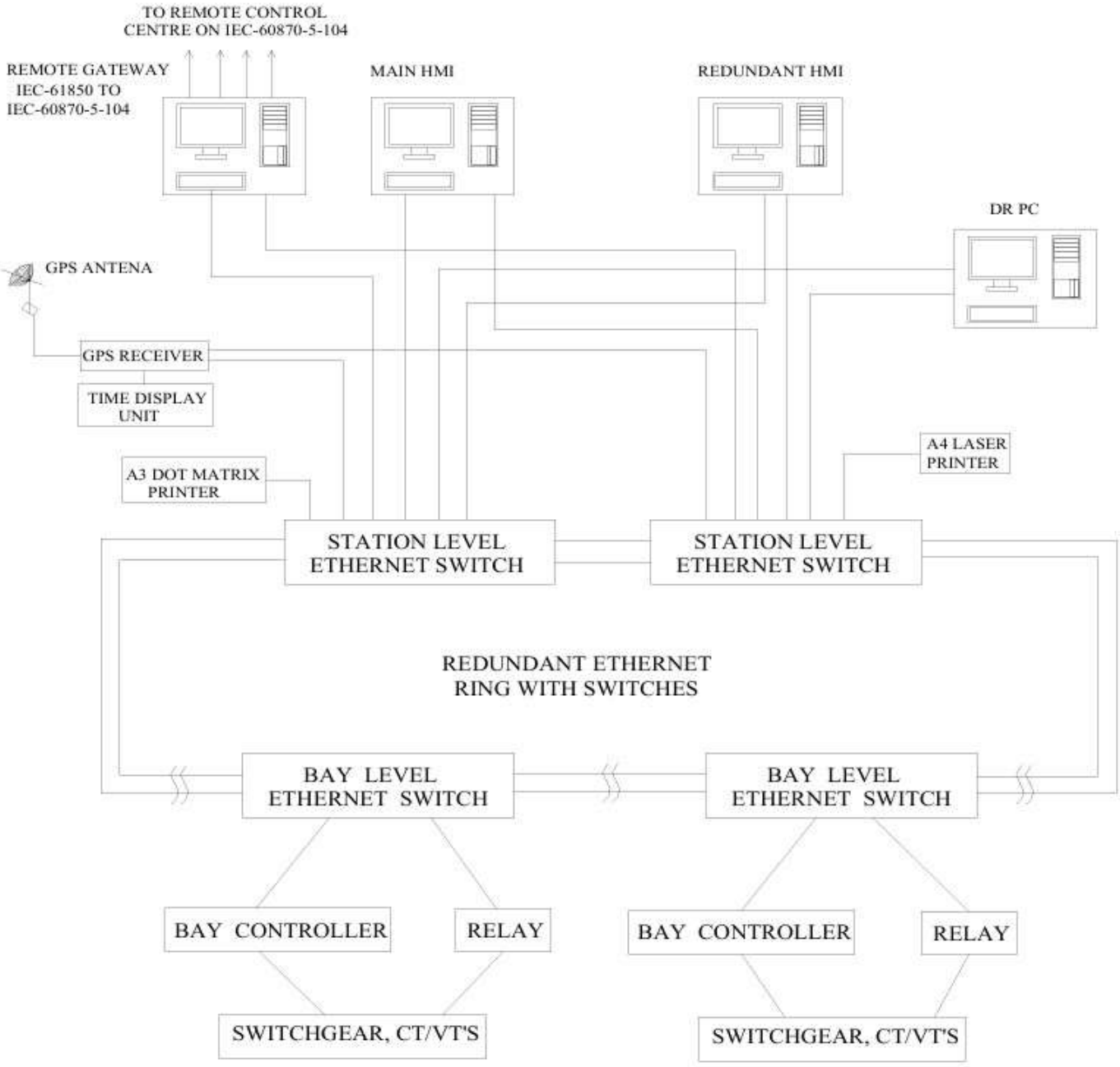
2500 MW, ±500kV HVDC TERMINAL & 400/220kV HVAC STATION KOLAR

drwng No: PGCIL/kolar/ 02



Drawing: KPTCL/01

TYPICAL ARCHITECTURAL DRAWING OF SUB-STATION AUTOMATION SYSTEM



HVAC

NTAMC other signals MFT/WTI/OTI

ICT-III data through 104

Switch in ICT-III RP

SIEMENS RUGGED COM SWITCH

NTAMC GE RTU RACKS & AUX BCU

NELCO RTU

ABB RTU

Soft signals through Serial 101 communication

Main & Standby ADVANTECH Gateways

Serial 101 Communication to SRLDC to ULC Mux Panel

Analog signals: MW, MVAR & Currents of all bays except ICT-1, ICT-2 & BR; Bus Voltages.

Digital signals: CB status of all bays except ICT-2 & BR

RAS SDC

PTZ CAMERAS [VMS]

NTAMC/ RAS PC

NTAMC Communication port

VMS PC

RS 232 RS 485

RS 232 RS 485

SIEMENS I/F PANNEL

RS 485 to FO

RS 485 to FO

HVAC COM PANEL

LIU

HVDC

FO

FO

OF

OF

LIU

OF

HVDC COM PANEL

FO to 485

20C097 XL PANNEL [HVDC]

FO to 485

Fire Wall

Fire Wall

RS 485 to 232

RS 485 to 232

SRLDC

NTAMC

BNTAMC

PLCC ROOM

Racket port

SRLDC Data from HVAC through ULDC MUX at HVAC

FO

Valiant MUX

TEJAS MUX

MPLS MUX MDA1

Micro SCADA HMI

HVAC COMMUNICATION ARCHITECTURE

drwng No: PGCIL/kolar/ 03