

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड

(भारत सरकार का उद्यम)

POWER GRID CORPORATION OF INDIA LIMITED

(A Government of India Enterprise)



केन्द्रीय कार्यालय : "सौदामिनी" प्लॉट सं. 2, सेक्टर-29, गुडगाँव-122 001, हरियाणा
फोन : 2571700 - 719, फैक्स : 2571760, 2571761 तार 'नेटग्रिड'
Corporate Office : "Saudamini" Plot No. 2, Sector-29, Gurgaon-122 001. Haryana
Tel. : 2571700 - 719, Fax : 2571760, 2571761 Gram : 'NATGRID'

संदर्भ संख्या/Ref. Number

C/ENGG/HVDC/NER-NR/221/ 402 6
ABB AB
HVDC
SE-771 80 Ludvika
Sweden

Date: 04.03.2014

Kind Attn.: Mr Goran Isacsson, Project Manager

विषय /Subject: ± 800 KV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector - I

- 415 V MCC for Valve Cooling at Agra

NOA No.: C-61901R-S056-8/NOA-I/3659, C-61901R-S056-8/NOA-II/3660,
C-61901R-S056-8/NOA-III/3661, C-61901R-S056-8/NOA-IV/3662
C-61901R-S056-8/NOA-V/3663 all dated 21st March 2011

Dear Sir,

कृप्या उपरोक्त विषय पर अपने पत्र संख्या TM-NEA1-14536 dated 13.02.14 का अवलोकन करे दस्तावेजों पर टिप्पणियों / अनुमोदन संलग्नित पेज में दिया गया है ।

In reference to your letter no TM-NEA1-14536 dated 13.02.14. we are here in conveying comments/ approval on the drawings/ documents listed in attached sheet. For approval/ comments code of each drawing/ documents, please refer the category indicated in remarks column.

अगर हमारे द्वारा चिह्नित संशोधन के आलावा आप कोई संशोधन करना चाहते हैं तो कृप्या उसे पूर्ण तर्कसंगति के साथ हाईलाइट करे एवं दस्तावेज को पुनः अनुमोदन हेतु दुबारा प्रेषित करे ।

In case of any modification other than those desired by us are carried out, the same shall be highlighted clearly in the Drawing/ Document with full justification thereof and resubmitted for approval.

दस्तावेजों में जो टिप्पणी / अनुमोदन दिया गया है उससे संविदाकार अपनी संविदा जिम्मेदारियों से और समय- समय पर लागू भारतीय स्टेचुररी कानून के अंतर्गत उसकी जिम्मेदारियों जैसे डायमें की यथार्थताए निर्माण में इस्तेमाल की गई सामग्री वजन मात्राएँ अभिकल्प ब्योरा ,कमेपहद कमजंपसेद्ध असम्बल फिटस निष्पादन ब्योरा और सामग्री पूर्ति से मुक्त नहीं होगा तथा क्रेता का इस संविदा के अधीन कोई भी अधिकार प्रतिबंधित नहीं होगा ।

Approval/ comments conveyed herein neither relieves the Contractor of his contractual obligation and his responsibilities for correctness of dimensions, material of constructions, weight, quantities, design details, assemble fits, performance particulars and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limits the Purchaser's right under the Contract.

सधन्यवाद ।

Thanking you,

भवदीय,

Yours faithfully

(Rakesh Kumar)
AGM (Engg-HVDC)

Sl. No.	Document No./ Drawing No.	Revision for PG	Document Title	Category of Approval	Remarks/ comments
1.	J-673 Rev 01	01	415V MCC FOR VALVE COOLING SYSTEM- COVERING SHEET- GA,SLD, BOM & SCHEME	I	
2.	J - 673 - 100 - 01 Rev 02	01	415V MCC FOR VALVE COOLING SYSTEM - GENERAL NOTES	I	
3.	J - 673 - 101 - 01 Rev 05	01	415V MCC FOR VALVE COOLING SYSTEM -GENERAL ARRANGEMENT DRAWING FOR P1 AND P4	I	
4.	J - 673 - 101 - 02 Rev 05	01	415V MCC FOR VALVE COOLING SYSTEM -GENERAL ARRANGEMENT DRAWING FOR P2 AND P3	I	
5.	J - 673 - 201 - 01 Rev 03	01	415V MCC FOR VALVE COOLING SYSTEM -SINGLE LINE DIAGRAM	I	
6.	J - 673 - 401 - 08 Rev-03	01	415V MCC FOR VALVE COOLING SYSTEM - SCHEMATIC DIAGRAM FOR 415V MCC BECKHOFF I/O UNIT	I	

CATEGORIES: -

- I Approved.
- II Approved with comments.
- III Returned for correction.
- IV For Information

ABB AB
HVDC

±800 kV, 6000 MW HVDC Multi Terminal NER/ER - NR/WR
Interconnector - I

Document Transmittal

ABB AB
Dept. PSDC/DCOC - NEA800
SE-771 80 Ludvika

Doc No: TM-NEA1-14536
Date: 2014-02-13
Reg./ Class No: NEA-D
Dealt with by: Pranita Singh

To: POWERGRID (NEA800) - Engineering
Attn: Mr. Madan Mohan Goswami
Copy to: Mr. Oommen Chandy, Mr. Bhoj Paul, Mr. Göran Isacson, Mrs. Renuka Gera & Mr. Abhay Kumar

Document No & Rev	Document Description	Document Type	Station	Action	Before	Class No X	Class No Y
J-673 Rev. 01	415V MCC (Motor Control Centre) for Valve Cooling System - Covering Sheet for GA, SLD, BOM & Scheme for AGR (BHEL)	LIST	Agra	Approval	2014-02-27	FJC	211
J-673-100-01 Rev. 02	415V MCC (Motor Control Centre) for Valve Cooling System - General Notes for AGR (BHEL)	Description	Agra	Approval	2014-02-27	FJC	211
J-673-100-CLAR-01 Rev. 00	Clarifications to Drawings of 415V MCC for Valve Cooling System, Rev 00 for AGR (BHEL)	Question and Answer	Agra	Information		FJC	211
J-673-101-01 Rev. 05	415V MCC (Motor Control Centre) for Valve Cooling System-General Arrangement Diagram for P1 and P4 for AGR (BHEL)	Arrangement Drawing	Agra	Approval	2014-02-27	FJC	211
J-673-101-02 Rev. 05	415V MCC (Motor Control Centre) for Valve Cooling System - General Arrangement Diagram for P2 and P3 for AGR (BHEL)	Arrangement Drawing	Agra	Approval	2014-02-27	FJC	211
J-673-201-01 Rev. 03	415V MCC (Motor Control Centre) for Valve Cooling System - Single Line Diagram for AGR (BHEL)	Single Line Diagram	Agra	Approval	2014-02-27	FJC	211
J-673-401-08 Rev. 03	415V MCC (Motor Control Centre) for Valve Cooling System - Schematic Diagram for 415V MCC Beckhoff I/O Unit for AGR (BHEL)	Diagram	Agra	Approval	2014-02-27	FJC	211

Best regards,
Pamela Isacson
Document Control Manager



±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER – NR/WR INTERCONNECTOR-I PROJECT

Bharat Heavy Electricals Limited

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

Clarifications to Drawings of 415V MCC FOR VALVE COOLING SYSTEM, Rev 00

Doc. No. : J-673-100-CLAR/01

Clarifications to POWERGRID's comments received vide letter no. C/ENGG/HVDC/NER-NR/221/3768 dated 24/01/2014 against our Transmittal No. TM-NEA1-14429 dated 13/01/2014.

S. No.	POWERGRID's Comments	BHEL's clarifications
1	Drawing No. J-673, Rev 00 - 415V MCC FOR VALVE COOLING SYSTEM – COVERING SHEET – GA,SLD, BOM & SCHEME 1. Incorporate all the comments in the respective drawings mentioned in this Covering sheet.	All Comments incorporated in revised submission.
2	Drawing No. J - 673 - 100 - 01, Rev 00 - 415V MCC FOR VALVE COOLING SYSTEM – GENERAL NOTES 1. Mention the size of gasket in the notes.	All Comments incorporated in revised submission.
3	Drawing No. J - 673 - 101 - 01, Rev 00 - 415V MCC FOR VALVE COOLING SYSTEM – GENERAL ARRANGEMENT DRAWING FOR P1 AND P4 J - 673 - 101 - 02, Rev 00 - 415V MCC FOR VALVE COOLING SYSTEM – GENERAL ARRANGEMENT DRAWING FOR P2 AND P3 1. 25% spare feeders for each fan group, heaters and valves to be provided. 2. 25% spare cards to be provided for Beckhoff I/O Units	1. Comments incorporated in revised submission. 2. As per contractual requirements, 10% spare cards of Beckhoff I/O Units shall be supplied loose along with the MCC. ✓



±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER – NR/WR INTERCONNECTOR-I PROJECT

Bharat Heavy Electricals Limited

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

Clarifications to Drawings of 415V MCC FOR VALVE COOLING SYSTEM, Rev 00

Doc. No.: J-673-100-CLAR/01

4	Drawing No. J - 673 - 201 - 01, Rev 00 - 415V MCC FOR VALVE COOLING SYSTEM – SINGLE LINE DIAGRAM J - 673 - 301 - 01, Rev 00 - 415V MCC FOR VALVE COOLING SYSTEM – BILL OF MATERIAL J - 673 - 401 - 08, Rev 00 - 415V MCC FOR VALVE COOLING SYSTEM – SCHEMATIC DIAGRAM FOR 415V MCC BECKHOFF I/O UNIT 1. Make the changes in line with comments on GA and General notes.	Comments incorporated in revised submission.
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1

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22. CONTROL WIRING WITH FLEXIBLE STRANDED COPPER CONDUCTOR ISI MARKED PVC 1.1KV GRADE INSULATED WIRES. SIZE SHALL BE AS FOLLOWS:-

- i) CT/PT CIRCUIT —————: 2.5 SQ. MM. (RED,YELLOW,BLUE,BLACK)
- ii) EARTHING —————: 2.5 SQ. MM. (GREEN)
- iii) SPACE HEATER CKT. —————: 2.5 SQ. MM. (BLACK)
- iv) AC CONTROL CKT. (MODULE) —————: 1.5 SQ. MM. (GREY)
- v) DC CONTROL CKT. (MODULE) —————: 1.5 SQ. MM. (GREY)
- vi) DC POWER SUPPLY TO I/O UNIT —————: 1.5 SQ. MM. (RED)
- vii) DI/DO CKT. OF BECKHOFF UNIT —————: MIN. 0.75 SQ. MM.

23. MIN. SIZE OF INTERNAL MODULE POWER WIRING, 1.1KV GRADE ISI MARKED BLACK PVC INSULATED FLEXIBLE STRANDED COPPER CONDUCTOR WIRE WITH COLOUR BAND.

A) POWER WIRING FOR STARTER MODULES

- i) UP TO 7.5KW —————: 4 SQ. MM., COPPER
- ii) 7.6KW TO 11KW —————: 6 SQ. MM., COPPER
- iii) 11.5KW TO 18.5KW —————: 10 SQ. MM., COPPER
- iv) 18.6KW TO 30KW —————: 16 SQ. MM., COPPER

B) POWER WIRING FOR OUTGOING FEEDERS

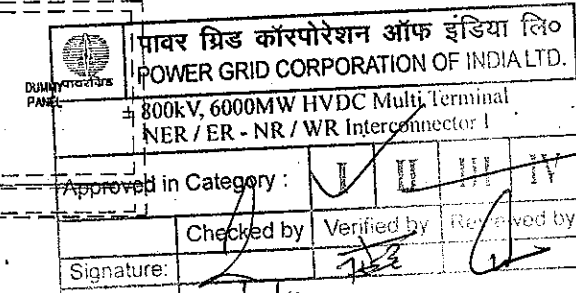
- i) UP TO 20A —————: 4 SQ. MM., COPPER
- ii) 21A TO 32A —————: 6 SQ. MM., COPPER
- iii) 33A TO 40A —————: 10 SQ. MM., COPPER
- iv) 41A TO 63A —————: 16 SQ. MM., COPPER
- v) 64A TO 75A —————: 25 SQ. MM., COPPER

24. METERS & INDICATING LAMP ETC. SHALL BE FLUSH MOUNTED. ✓

25. INDICATING LAMP SHALL BE "LED TYPE".

SL.NO.	SYMBOL	DESCRIPTION	SL.NO.	SYMBOL	DESCRIPTION
1		MOULDED CASE CIRCUIT BREAKER	13		POTENTIAL TRANSFORMER 415V/3/110VAC/3
2		MOTOR PROTECTION CIRCUIT BREAKER	14		LATCHING TYPE AUX. CONTACTOR.
3		3POLE POWER CONTACTOR	15		STOP PUSH BUTTON
4		POWER CONTACTOR COIL	16		START PUSH BUTTON
5		AUX CONTACTOR	17		VOLTAGE TRANSDUCER
6		AMMETER	18		VOLTAGE MONITORING RELAY
7		VOLTMETER	19		C.T SHORTING TERMINALS
8		KWH METER	20		SPACE HEATER
9		SELECTOR SWITCH	21		FUSE BASE WITH FUSE LINK
10		CURRENT TRANSFORMER	22		NEUTRAL LINK
11		INDICATING LAMP	23		FIXED TERMINAL BLOCK
12		MINIATURE CIRCUIT BREAKER	24		DRAWOUT TERMINAL

				DRN.	NAME	SIGN	Manufacturer:-	CUSTOMER	DESCRIPTION	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM
				PRPD.	S.S.GAUR		UNILEC ENGINEERS LTD.	POWER GRID CORPORATION OF INDIA LIMITED.	DETAILS	GENERAL NOTES
				CHKD.	D.KUMAR		UNILEC ENGINEERS LTD.	CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.	BHEL DRG. No.	REV:- -
				APPD.	K.C.BHATT		UNILEC ENGINEERS LTD.	TRANSMISSION PROJECTS DIVISION	UJEL DRG. No.	REV:- R2
				DATE	03.10.2013		UNILEC ENGINEERS LTD.	PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL	SHEET NO.	02 OF 02
				SCALE	NTS		UNILEC ENGINEERS LTD.	NER/ER-NR/WR INTERCONNECTOR-1 PROJECT		
2	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	DATE	03.10.2013					
1	REVISED AS PER CLIENT COMM. DT.11.11.13	13.11.13	S.S.G	DATE	03.10.2013					
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS					



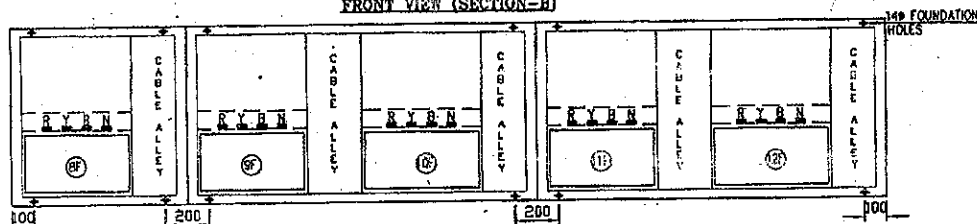
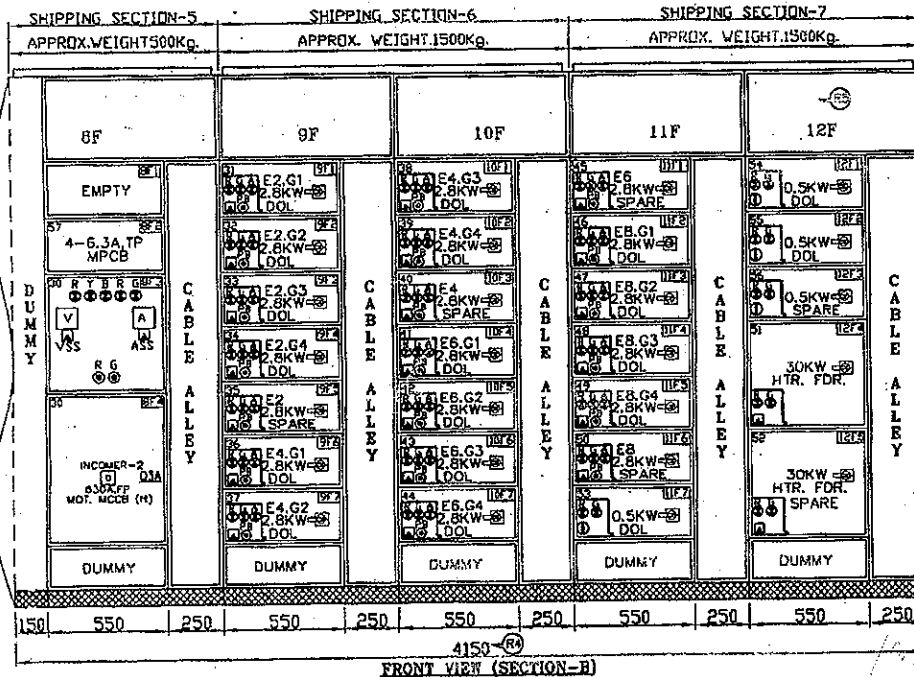
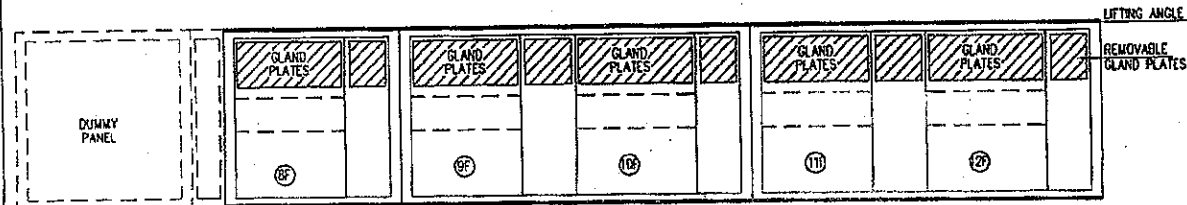
INTER PANEL WIRING FROM BOTTOM



S3.P1.U.E.MM
S3.P4.U.E.MM

DESCRIPTION	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM		
DETAILS	GENERAL ARRANGEMENT DIAGRAM		
BHEL DRG. No.	---	---	---
UCL DRG. No.	J-673-101-01		REV.: - R
SHEET NO.	01 OF 03		

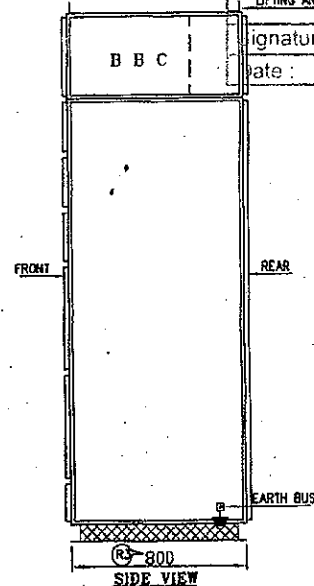
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NOTE:-

1. GENERAL TOLERANCE ± 25 mm.
2. DOOR & MOUNTING LAYOUT ARE INDICATIVE ONLY & ARRANGEMENT CAN BE CHANGED AS PER ACTUAL REQUIREMENT.

	पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लि. POWER GRID CORPORATION OF INDIA LTD.
± 800kV, 6000MW HVDC Multi Terminal NER / ER - NR / WR Interconnector-I	
Approved in Category : I II III IV	
LIFTING ANGLE	Checked by
Signature:	Verified by
Date:	Reviewed by



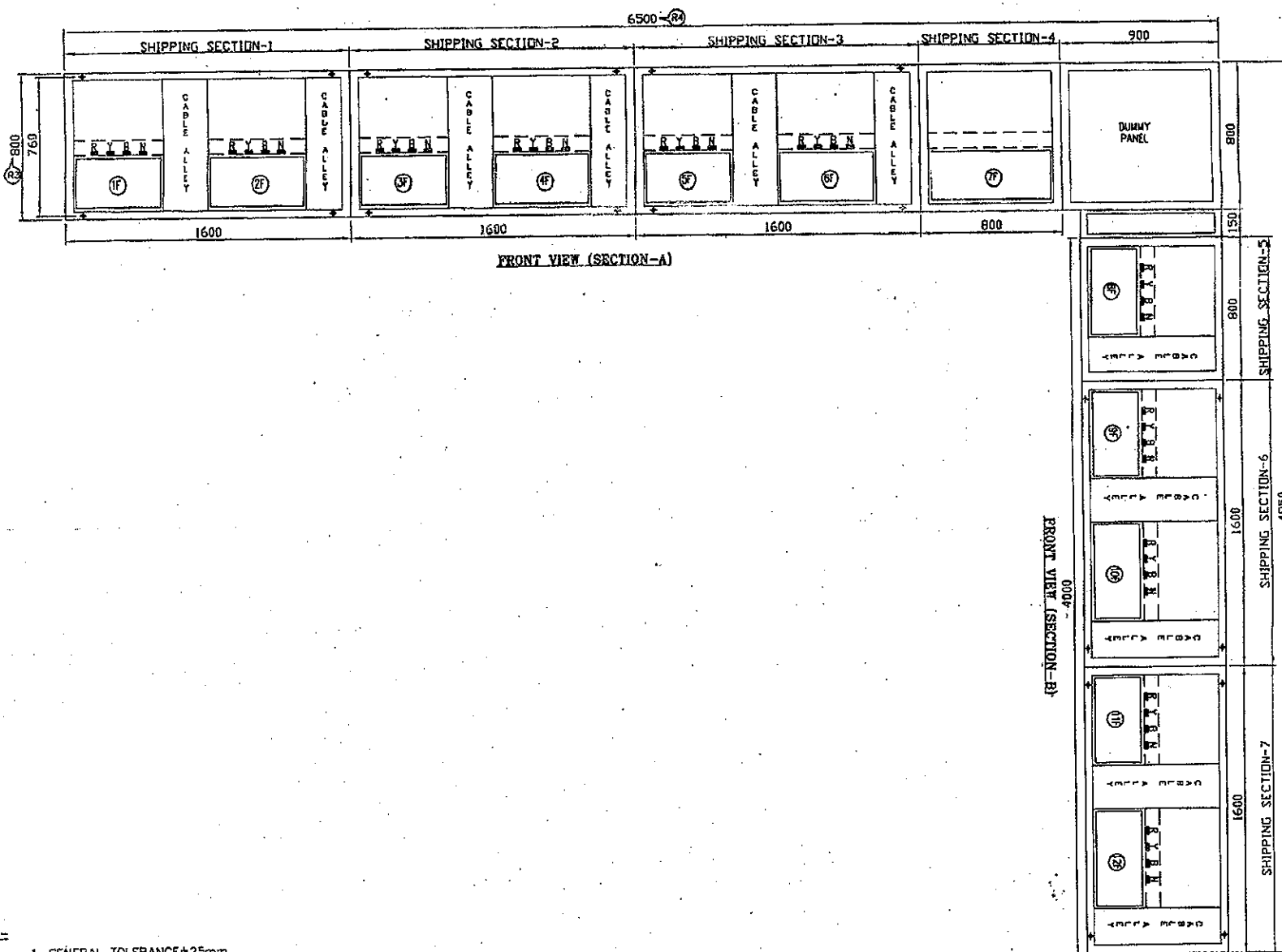
BOARD NAME PALTE FOR APPLICABLE

S3.P1.U.E.MM
S3.P4.U.E.MM

REV	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	Manufacturer:- UNILEC UNILEC ENGINEERS LTD. UNIT-1:- Begumpur Khola Road, Gurgaon-122001 UNIT-2:- Bawal Dist. Rewari	CUSTOMER पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लि. POWER GRID CORPORATION OF INDIA LIMITED. (A Government of India Enterprise) CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT	DESCRIPTION 415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM DETAILS GENERAL ARRANGEMENT DIAGRAM BHEL DRG. No. -- UEL DRG. No. J-673-101-01 SHEET NO. 02 OF 03	REV:- R5
R5	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	DRN	NAME	SIGN			
R4	REVISED AS PER CLIENT COMM. DT.19.12.13	20.12.13	S.S.G	PRPD	S.S.GAUR				
R3	REVISED AS PER CLIENT DISS. DT.17.12.13	17.12.13	S.S.G	CHKD	D.KUMAR				
R2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	APPO	K.C.BHATT				
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	03.10.2013				

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01 02 03 04 05 06 07 08



NOTE:-

1. GENERAL TOLERANCE ± 25 mm.
2. DOOR & MOUNTING LAYOUT ARE INDICATIVE ONLY & ARRANGEMENT CAN BE CHANGED AS PER ACTUAL REQUIREMENT.

REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	DRN.	NAME	SIGN	Manufacturer:-	CUSTOMER	DESCRIPTION
R5	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G						UNILEC	UNILEC ENGINEERS LTD.	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM
R4	REVISED AS PER CLIENT COMM. DT.19.12.13	20.12.13	S.S.G	PRPD.	S.S.GAUR				UNILEC ENGINEERS LTD.	UNILEC ENGINEERS LTD.	GENERAL ARRANGEMENT DIAGRAM
R3	REVISED AS PER CLIENT DISS. DT.17.12.13	17.12.13	S.S.G	CHKD.	D.KUMAR				UNILEC ENGINEERS LTD.	UNILEC ENGINEERS LTD.	
R2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT				UNILEC ENGINEERS LTD.	UNILEC ENGINEERS LTD.	
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	03.10.2013				UNILEC ENGINEERS LTD.	UNILEC ENGINEERS LTD.	
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS				UNILEC ENGINEERS LTD.	UNILEC ENGINEERS LTD.	

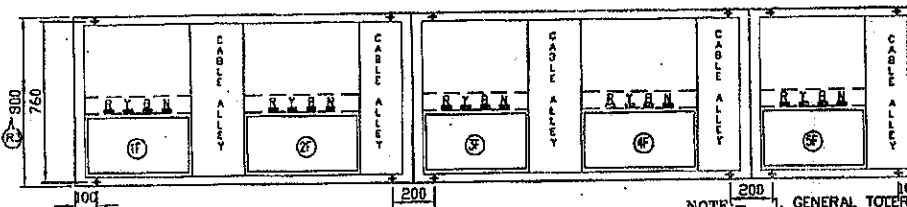
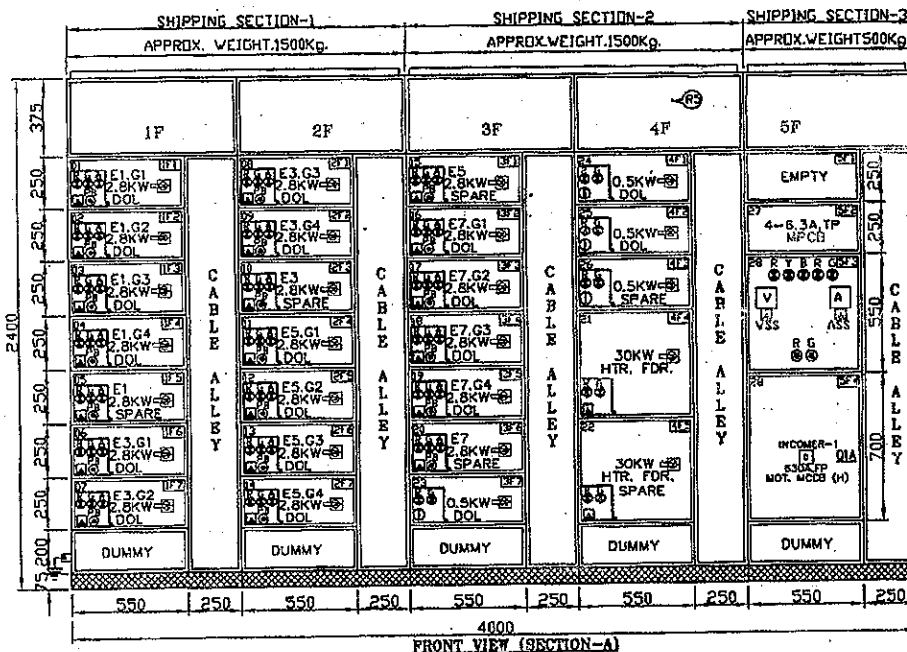
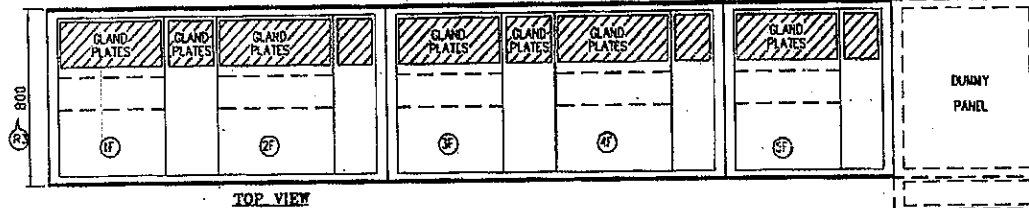
Manufacturer:-
UNILEC
UNILEC ENGINEERS LTD.
UNIT-1-Begunpur Khado Road,
Barampur Industrial Area,
Gurgaon-122001
UNIT-2-Bawal Distt. Bawal

CUSTOMER
UNILEC ENGINEERS LTD.
UNILEC ENGINEERS LTD.
CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION
PROJECT:- ± 800 KV, 60COMW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION
415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM
DETAILS
GENERAL ARRANGEMENT DIAGRAM
BHEL DRG. No. --
UEL DRG. No. J-673-101-01
SHEET NO. 03 OF 03

At-1
2/3

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BOTTOM FOUNDATION PLAN

NOTE:-

1. GENERAL TOLERANCE ± 25 mm.
2. DOOR & MOUNTING LAYOUT ARE INDICATIVE ONLY & ARRANGEMENT CAN BE CHANGED AS PER ACTUAL REQUIREMENT.

REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R5	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G		
R4	REVISED AS PER CLIENT COMM. DT.19.12.13	20.12.13	S.S.G	PRPD.	S.S.GAUR
R3	REVISED AS PER CLIENT DISS. DT.17.12.13	17.12.13	S.S.G	CHRD.	D.KUMAR
R2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	APFD.	K.C.BHATTI
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	03.10.2013

Manufacturer:-
UNILEC
 UNILEC ENGINEERS LTD.
 Unit-15, Pargunah Khastola Road,
 Bahrampur Industrial Area,
 Gurgaon-122001
 UNIT-2-Bawal Mill, Rewari

CUSTOMER
POWER GRID CORPORATION OF INDIA LIMITED
 TRANSMISSION PROJECTS DIVISION
 CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
 PROJECT:- ± 800 KV, 6000MW, HVDC MULTI-TERMINAL
 NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM
DETAILS	GENERAL ARRANGEMENT DIAGRAM
BHEL DRG. No.	---
UNEL DRG. No.	J-673-101-02
SHEET NO.	01 OF 03

HORIZONTAL BUS BAR SIZE:- 630A AL
POWER GRID CORPORATION OF INDIA LTD.

PHASE : 2x63x6mm. AL
 NEUTRAL : 1x63x6mm. AL
 EARTH : 1x50x12mm. AL

CABLE ENTRY:- TOP

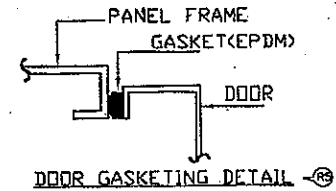
Approved in Category : **IV**

MCC VERTICAL BUS BAR

PHASE : 1x50x12mm. AL
 NEUTRAL : 1x30x12mm. AL

MCC VERTICAL EARTH BUS : 1x25x6mm. AL

INTER PANEL WIRING FROM BOTTOM

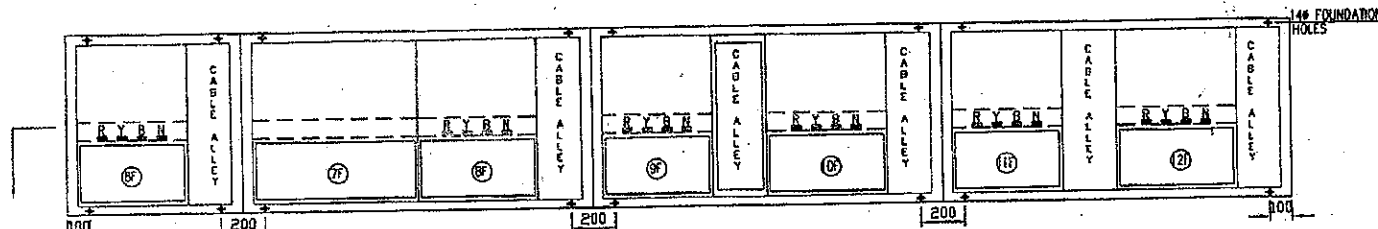
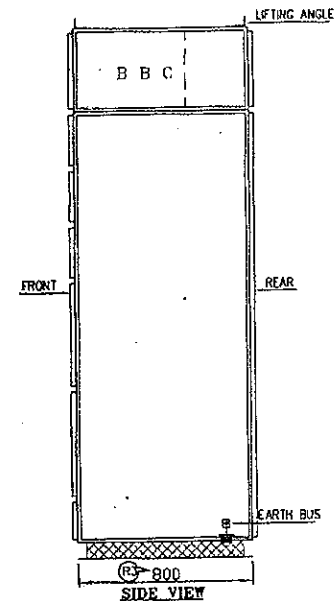
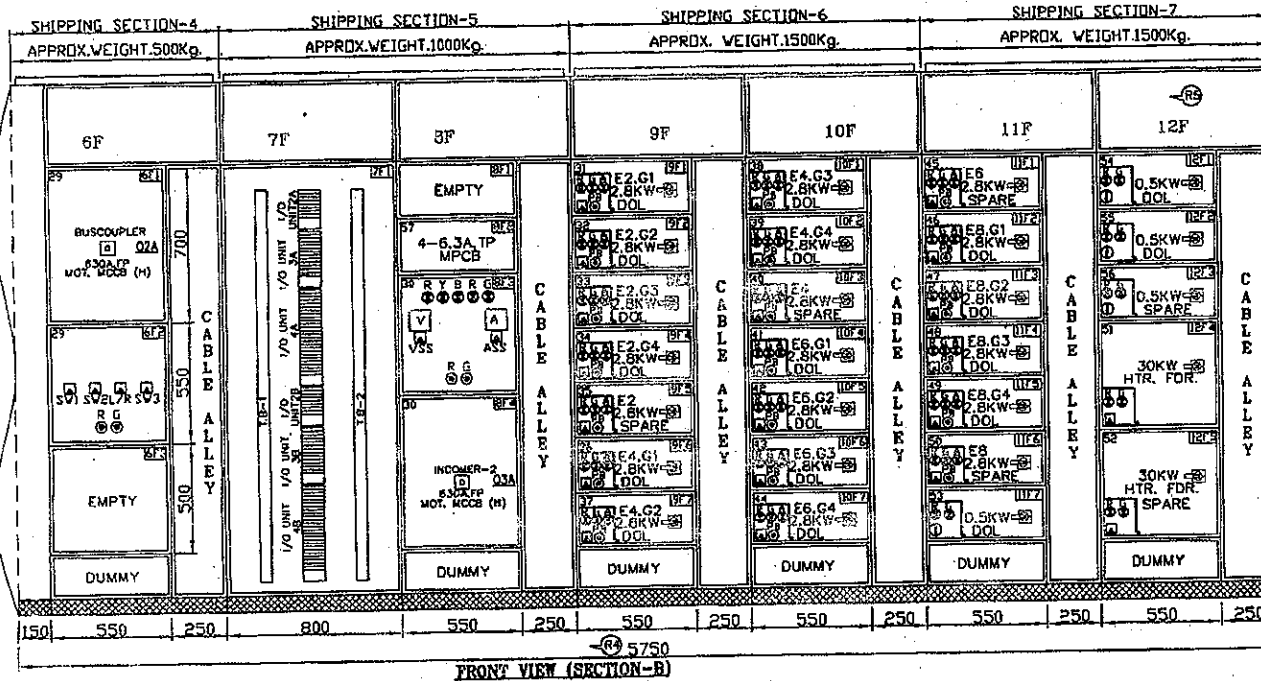
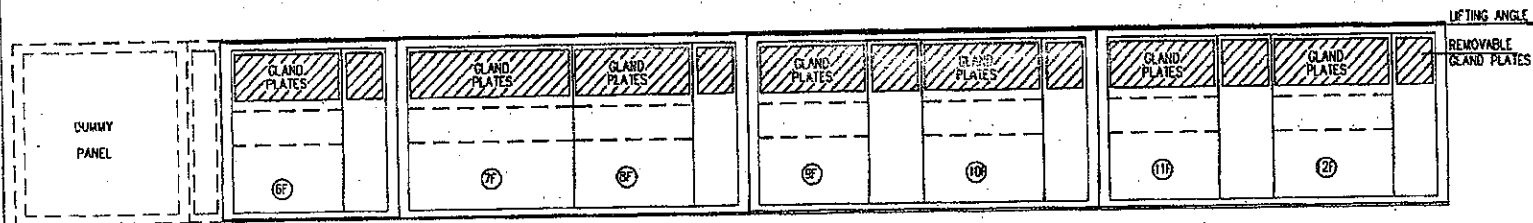


BOARD NAME PALTE FOR APPLICABLE

S3.P2.U.E.MM
 S3.P3.U.E.MM

D

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NOTE:-

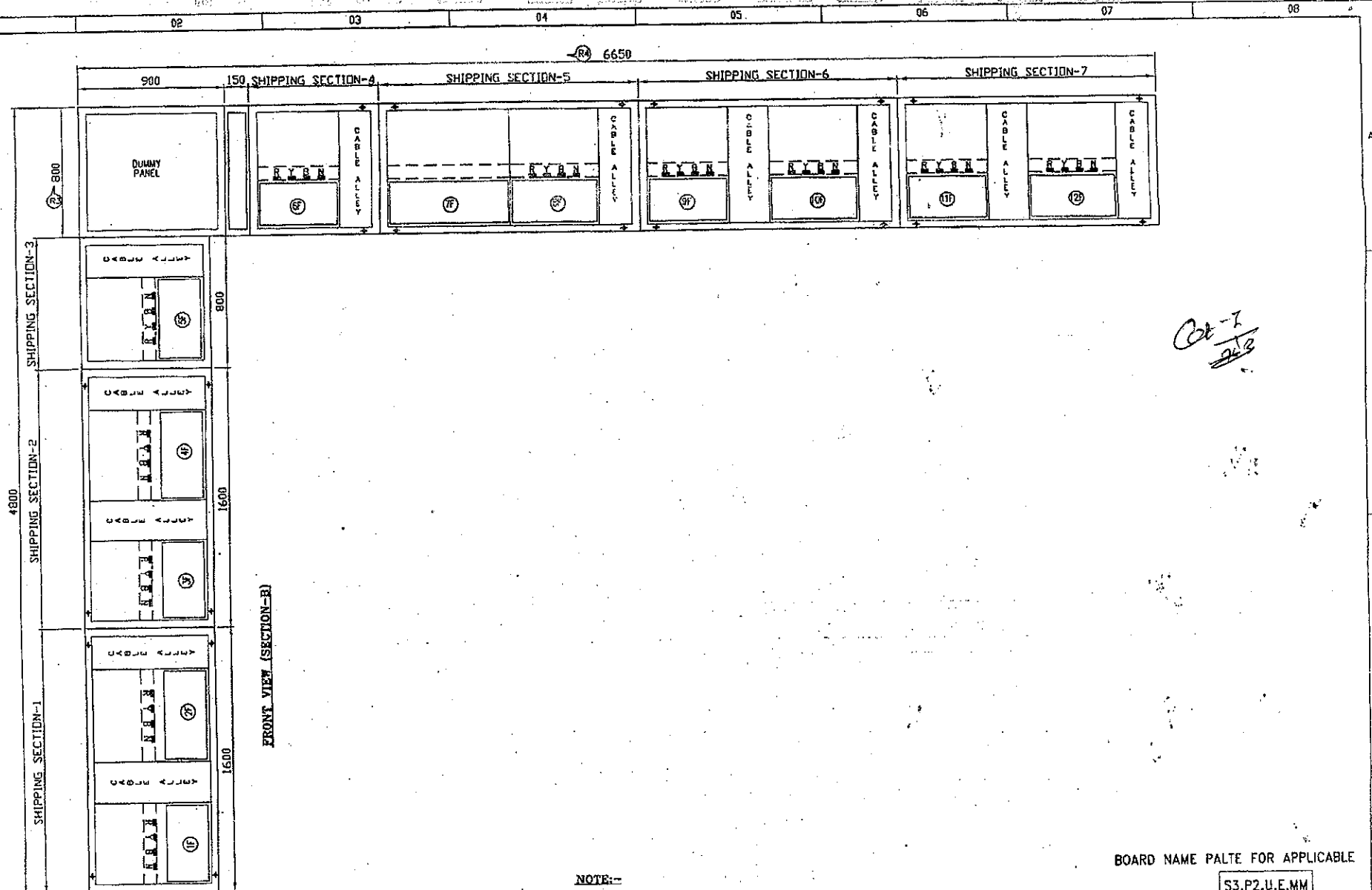
1. GENERAL TOLERANCE ± 25 mm.
2. DOOR & MOUNTING LAYOUT ARE INDICATIVE ONLY & ARRANGEMENT CAN BE CHANGED AS PER ACTUAL REQUIREMENT.

BOARD NAME PALTE FOR APPLICABLE

S3.P2.U.E.MM
S3.P3.U.E.MM

REV	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	DRN.	NAME	SIGN	Manufacturer:-	CUSTOMER	DESCRIPTION	DETAILS	BHEL DRG. No.	REL DRG. No.	SHEET NO.	REV:- R5
R5	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G						UNILEC	POWER GRID CORPORATION OF INDIA LIMITED.	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM	GENERAL ARRANGEMENT DIAGRAM	---	J-573-101-02	02 OF 03	
R4	REVISED AS PER CLIENT COMM. DT.19.12.13	20.12.13	S.S.G	PRPD	S.S.GAUR				UNILEC ENGINEERS LTD.	CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION						
R3	REVISED AS PER CLIENT DISS. DT.17.12.13	17.12.13	S.S.G	CHKD	O.KUMAR				UNILEC ENGINEERS LTD.	PROJECT:- 680KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT						
R2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	APPD	K.C.BHATT				UNILEC ENGINEERS LTD.							
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	03.10.2013				UNILEC ENGINEERS LTD.							
REV	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS				UNILEC ENGINEERS LTD.							

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NOTE:-

1. GENERAL TOLERANCE ± 25 mm.
2. DOOR & MOUNTING LAYOUT ARE INDICATIVE ONLY & ARRANGEMENT CAN BE CHANGED AS PER ACTUAL REQUIREMENT.

BOARD NAME PALTE FOR APPLICABLE

S3.P2.U.E.MM
S3.P3.U.E.MM

REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	DRN.	NAME	SIGN	Manufacturer:-	CUSTOMER	DESCRIPTION	DETAILS	BHEL DRG. No.	UEL DRG. No.	SHEET NO.	REV.:-
R5	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G			DRN.	NAME	SIGN	UNILEC ENGINEERS LTD.	POWER GRID CORPORATION OF INDIA LIMITED.	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM	GENERAL ARRANGEMENT DIAGRAM				
R4	REVISED AS PER CLIENT COMM. DT.19.12.13	20.12.13	S.S.G	PRPD.	S.S.GAUR				UNIT-1:- Begumpur Khata Road, Behrampur Industrial Area, Gurgaon-122001							
R3	REVISED AS PER CLIENT DISS. DT.17.12.13	17.12.13	S.S.G	CHKD.	D.KUMAR				UNIT-2:- Bawal Dalt, Rawari							
R2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT											
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	03.10.2013											
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS											

CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION
PROJECT:- ± 800 KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION
DETAILS
BHEL DRG. No.
UEL DRG. No.
SHEET NO.

REV.:- R5

03 OF 03

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पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लि.
POWER GRID CORPORATION OF INDIA LTD.

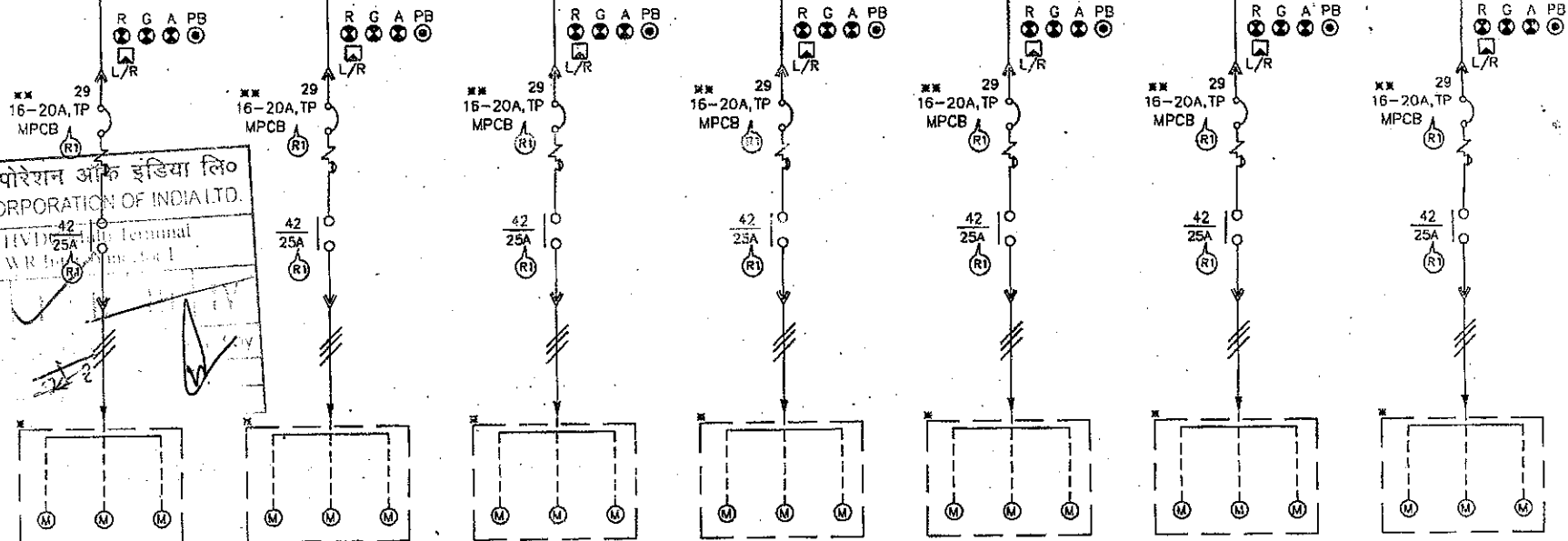
± 800kV, 6000MW HVDC Inter Terminal
NER/FR-NR-WR Interconnector-1

Approved in Category

Signature

Date: 04/03/14

415V, 630A, 3PHASE, 4WIRE, 50HZ, 20KA FOR 1SEC. AL. BUSBAR, BUS-A



MODULE LOCATION	1F1	1F2	1F3	1F4	1F5	1F6	1F7
FEEDER NO.	01	02	03	04	05	06	07
LOAD IN (KVA/KVAR/KW/AMPS)	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW
CABLE SIZE SQ.MM.	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	---	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)
TYPE/RATING	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB
DESCRIPTION	FAN GROUP 1-1	FAN GROUP 1-2	FAN GROUP 1-3	FAN GROUP 1-4	FAN GROUP 1 (SPARE)	FAN GROUP 3-1	FAN GROUP 3-2
TAG NO.	E1.G1	E1.G2	E1.G3	E1.G4	---	E3.G1	E3.G2
SCHEME REF./MODULE TYPE	VCF	VCF	VCF	VCF	VCF	VCF	VCF

* NOTE- NOT IN UEL SCOPE

** MPCB RANGE INDICATED IS L&T MAKE & SAME CAN BE CHANGE AS PER FINAL SELECTED MAKE.

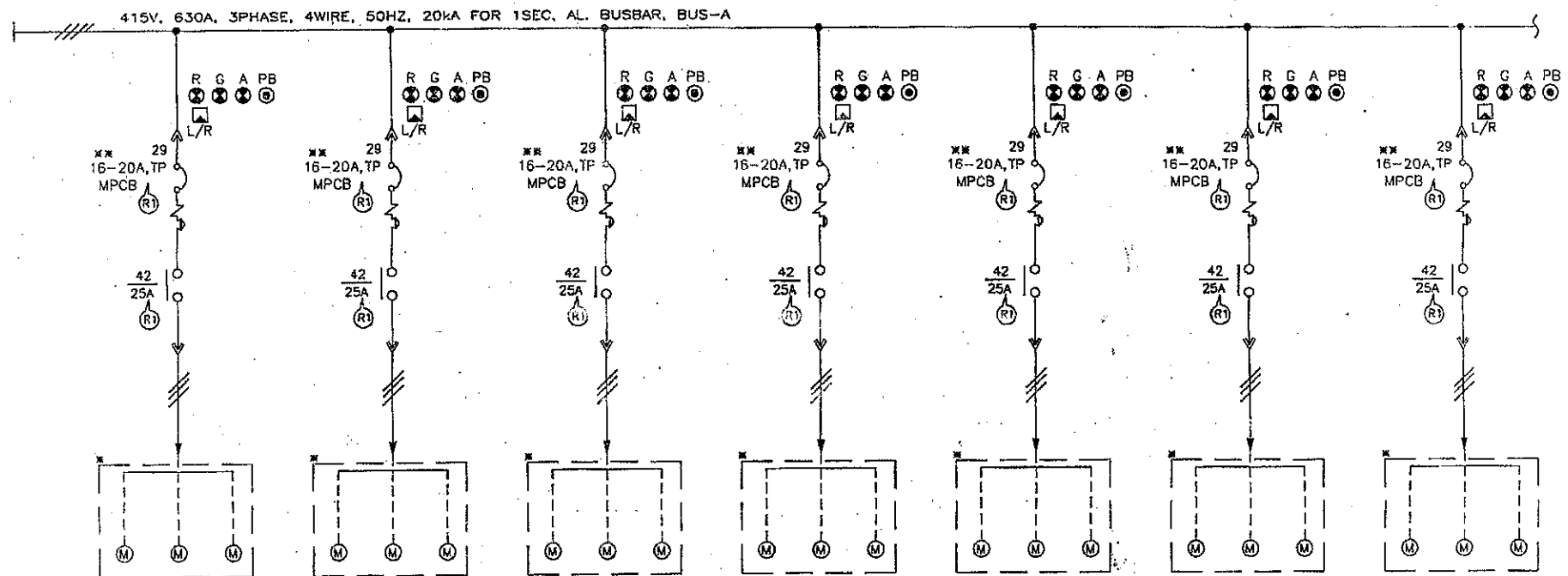
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
1	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD.	D.KUMAR
2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT
3	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	30.09.2013

Manufacturer:-
UNILEC
UNILEC ENGINEERS LTD.
UNIT-1:-Bagumpur Khelolu Road,
Behrampur Industrial Area,
Gurgaon-122001
UNIT-2:-Bawal Dist. Rewari

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
CONTRACTOR:-**BHARAT HEAVY ELECTRICALS LTD.,**
TRANSMISSION PROJECTS DIVISION
PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM		
DETAILS	SINGLE LINE DIAGRAM		
BHEL DRG. No.	TB-3-343-316-130	REV.:-	01
UEL DRG. No.	J-673-201-01	REV.:-	R3
SHEET NO.	01 OF 09		

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MODULE LOCATION	2F1	2F2	2F3	2F4	2F5	2F6	2F7
FEEDER NO.	08	09	10	11	12	13	14
LOAD IN (KVA/KVAR/KW/AMPS)	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW
CABLE SIZE SQ.MM.	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	--	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)
TYPE/RATING	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB
DESCRIPTION	FAN GROUP 3-3	FAN GROUP 3-4	FAN GROUP 3 (SPARE)	FAN GROUP 5-1	FAN GROUP 5-2	FAN GROUP 5-3	FAN GROUP 5-4
TAG NO.	E3.G3	E3.G4	--	E5.G1	E5.G2	E5.G3	E5.G4
SCHEME REF./MODULE TYPE	VCF	VCF	VCF	VCF	VCF	VCF	VCF

* NOTE-- NOT IN UEL SCOPE

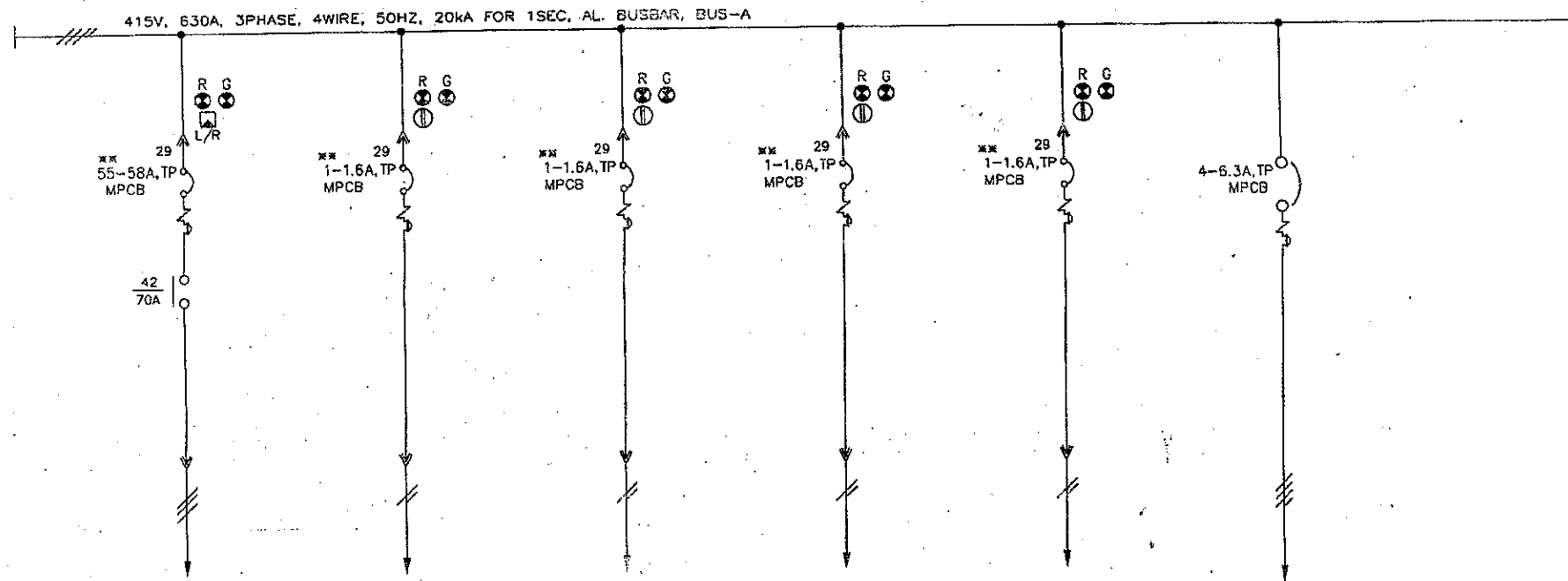
** MPCB RANGE INDICATED IS L&T MAKE & SAME CAN BE CHANGE AS PER FINAL SELECTED MAKE.

REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	Manufacturer:- UNILEC UNILEC ENGINEERS LTD. UNIT-1-Begunpur Khola Road, Bahrampur Industrial Area, Gurgaon-122081 UNIT-2-Bawal Distt. Rewari	CUSTOMER:- POWER GRID CORPORATION OF INDIA LIMITED. (Transmission) CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT	DESCRIPTION	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM
3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	PRPD.	S.S.GAUR			DETAILS	SINGLE LINE DIAGRAM
2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	CHKD.	D.KUMAR			BHEL DRG. No.	TB-3-343-316-130
1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	APPD.	R.C.BHATTI			UEL DRG. No.	J-673-201-01
								SHEET NO.	02 OF 09

REV:- 01

REV:- R3

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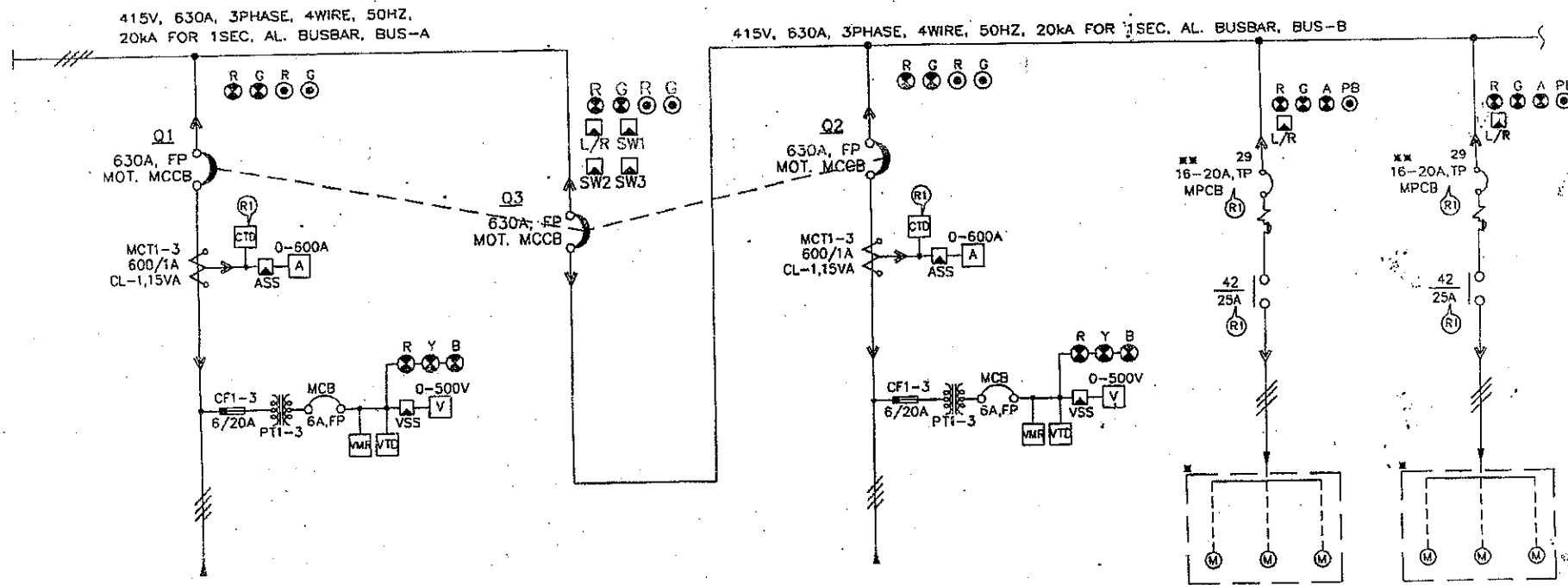
MODULE LOCATION	4F5	3F7	4F1	4F2	4F3	5F2
FEEDER NO.	22	23	24	25	26	27
LOAD IN (KVA/KVAR/KW/AMPS)	30KW R3	0.5KW	0.5KW	0.5KW	0.5KW R3	6A
CABLE SIZE SQ.MM.	--	2CX6 SQ.MM. (PVC/AL)	2CX6 SQ.MM. (PVC/AL)	2CX6 SQ.MM. (PVC/AL)	--	4CX6 SQ.MM. (PVC/AL)
TYPE/RATING	MPCB	MPCB	MPCB	MPCB	MPCB	MCB
DESCRIPTION	HEATER (SPARE)	VALVES	VALVES	VALVES	VALVES (SPARE)	REPLENISHMENT PUMP
TAG NO.	-	-	-	-	-	-
SCHEME REF./MODULE TYPE	HTR.	VLV	VLV	VLV	VLV	X

* NOTE - NOT IN UEL SCOPE

** MPCB RANGE INDICATED IS L&T MAKE & SAME CAN BE CHANGE AS PER FINAL SELECTED MAKE.

REVISION				MANUFACTURER:-		CUSTOMER:-		DESCRIPTION	
1	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	PRPD.	S.S.GAUR	UNILEC ENGINEERS LTD.	POWER GRID CORPORATION OF INDIA LIMITED.	DETAILS	SINGLE LINE DIAGRAM
2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	CHKD.	D.KUMAR	UNIT-1:- Begumpur Khatola Road, Barampura Industrial Area, Gurgaon-122001	CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	BHEL DRG. No.	TB-3-343-316-130
3	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	30.09.2013	UNIT-2:- Bawal Dalk. Rawari	PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-1 PROJECT	UEL DRG. No.	J-673-201-01
DESCRIPTION OF CHANGE				DATE	SIGN	SCALE	NTS	SHEET NO.	04 OF 09

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MODULE LOCATION	5F3-5F4	6F1-6F2	8F3-8F4	9F1	9F2
FEEDER NO.	28	29	30	31	32
LOAD IN (kW/kVAR/kW/AMPS)	630A	630A	630A	3X2.8KW	3X2.8KW
CABLE SIZE SQ.MM.	2RX1CX630 SQ. MM. (XLPE/AL.)	---	2RX1CX630 SQ. MM. (XLPE/AL.)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)
TYPE/RATING	MCCB	MCCB	MCCB	MPCB	MPCB
DESCRIPTION	INCOMER-1 S3.AL.P1.LVS SUPPLY.A	BUSCOUPLER	INCOMER-2 S3.AL.P1.LVS SUPPLY B	FAN GROUP 2-1	FAN GROUP 2-2
TAG NO.	-	-	-	E2.G1	E2.G2
SCHEME REF./MODULE TYPE	H	H	H	VCF	VCF

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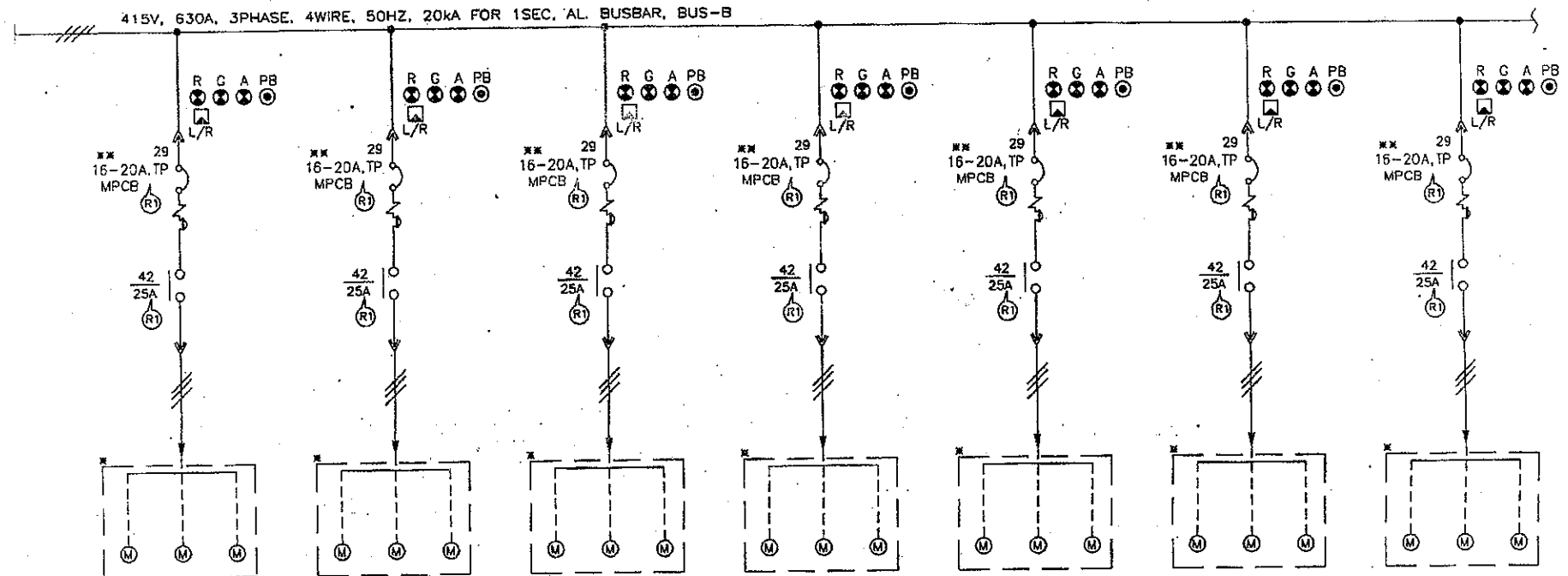
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	PRPD.	S.S.GAUR
R2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	CHKD.	D.KUMAR
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	APPD.	K.C.BHATT

Manufacturer:-
UNILEC
UNILEC ENGINEERS LTD.
UNIT-1, Begumpur Khola Road,
Brahmapur Industrial Area,
Gurgaon-122001
125T-21-Begumt Road

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
CONTRACTOR:-
TRANSMISSION PROJECTS DIVISION
PROJECT:-
±800KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

NO	DESCRIPTION	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM	
	DETAILS	SINGLE LINE DIAGRAM	
	BHEL DRG. No.	TB-3-343-316-130	REV.: - 01
	UEL DRG. No.	J-673-201-01	REV.: - R3
	SHEET NO.	05 OF 09	

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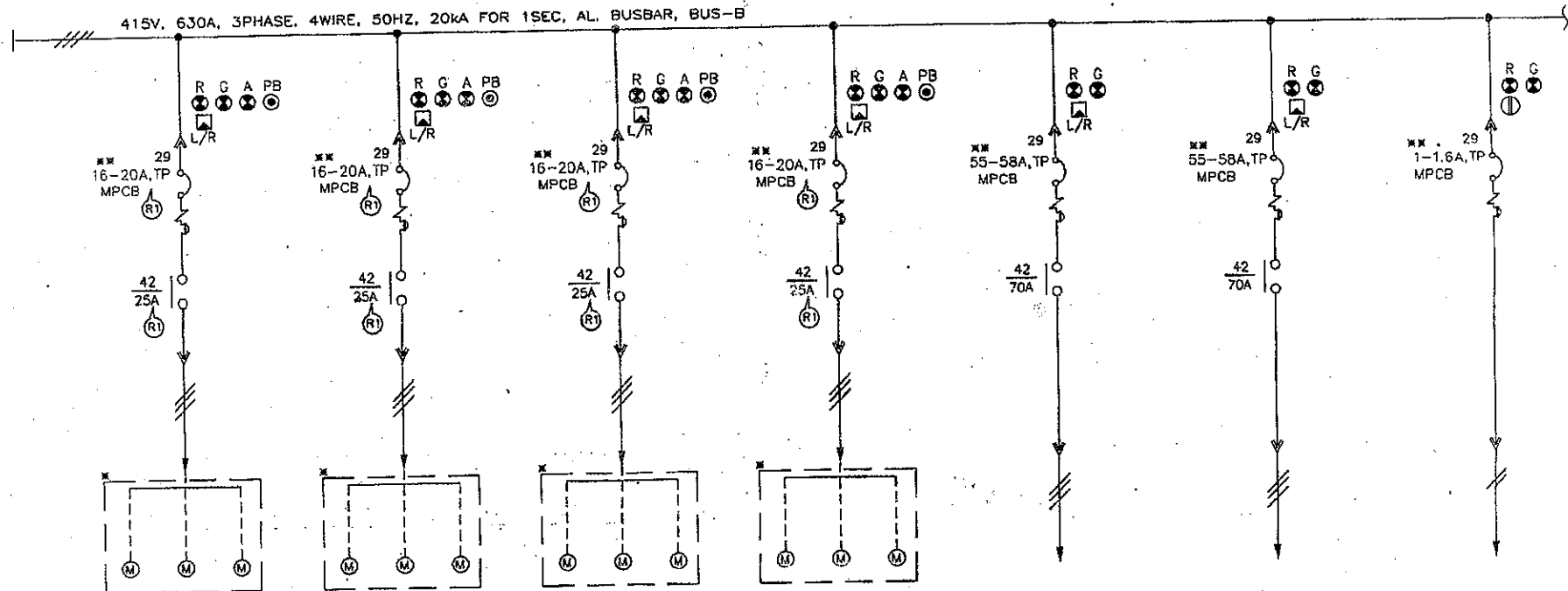
MODULE LOCATION	9F3	9F4	9F5	9F6	9F7	10F1	10F2
FEEDER NO.	33	34	35	36	37	38	39
LOAD IN (KVA/KVAR/KW/AMPS)	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW
CABLE SIZE SQ.MM.	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	---	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)
TYPE/RATING	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB
DESCRIPTION	FAN GROUP 2-3	FAN GROUP 2-4	FAN GROUP 2 (SPARE)	FAN GROUP 4-1	FAN GROUP 4-2	FAN GROUP 4-3	FAN GROUP 4-4
TAG NO.	E2.G3	E2.G4	---	E4.G1	E4.G2	E4.G3	E4.G4
SCHEME REF./MODULE TYPE	VCF	VCF	VCF	VCF	VCF	VCF	VCF

* NOTE- NOT IN UEL SCOPE

** MPCB RANGE INDICATED IS L&T MAKE & SAME CAN BE CHANGE AS PER FINAL SELECTED MAKE.

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DESCRIPTION	415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM
DETAILS	SINGLE LINE DIAGRAM
BHEL DRG. No.	T8-3-343-316-130
UCL DRG. No.	J-673-201-01
SHEET NO.	06 OF 09



MODULE LOCATION	11F3	11F4	11F5	11F6	12F4	12F5	11F7
FEEDER NO.	47	48	49	50	51	52	53
LOAD IN (KVA/KVAR/KW/AMPS)	3X2.8KW	3X2.8KW	3X2.8KW	3X2.8KW (R)	30KW	30KW (R)	0.5KW
CABLE SIZE SQ.MM.	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	4CX6 SQ.MM. (PVC/AL)	--	4CX6 SQ.MM. (PVC/AL)	--	2CX6 SQ.MM. (PVC/AL)
TYPE/RATING	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB	MPCB
DESCRIPTION	FAN GROUP 8-2	FAN GROUP 8-3	FAN GROUP 8-4	FAN GROUP 8 (SPARE)	HEATER	HEATER (SPARE)	VALVES
TAG NO.	E8.G2	E8.G3	E8.G4	--	--	--	--
SCHEME REF./MODULE TYPE	VCF	VCF	VCF	VCF	HTR.	HTR.	VLV

* NOTE - NOT IN UEL SCOPE

** MPCB RANGE INDICATED IS L&T MAKE & SAME CAN BE CHANGE AS PER FINAL SELECTED MAKE.

REVISION				MANUFACTURER		CUSTOMER		DESCRIPTION	
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD.	D.KUMAR	UNILEC ENGINEERS LTD.	POWER GRID CORPORATION OF INDIA LIMITED.	DETAILS	SINGLE LINE DIAGRAM
R2	REVISED AS PER CLIENT DISS. DT.29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT	UNILEC ENGINEERS LTD.	CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION.	BHEL DRG. No.	TB-3-343-316-130
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	30.09.2013	UNILEC ENGINEERS LTD.	PROJECT: ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-1 PROJECT	UEL DRG. No.	J-673-201-01
KEY	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	UNILEC ENGINEERS LTD.		SHEET NO.	08 OF 09

001

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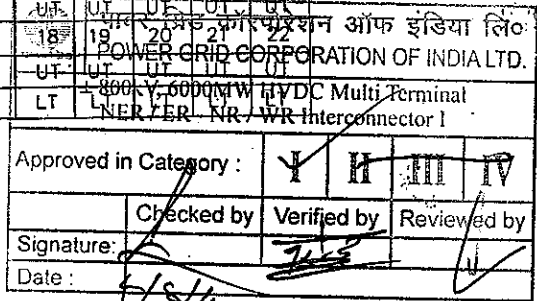
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009

SCHEMATIC DIAGRAM FOR 415V MCC BECKHOFF I/O UNIT

	पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लि० POWER GRID CORPORATION OF INDIA LTD.
± 800kV, 6000MW HVDC Multi Terminal NER / ER - NR / WR Interconnector I	
Approved in Category : ☒ I ☐ II ☐ III ☐ IV	
Signature:	Checked by: ☒ Verified by: ☒
Date: 04/01/14	

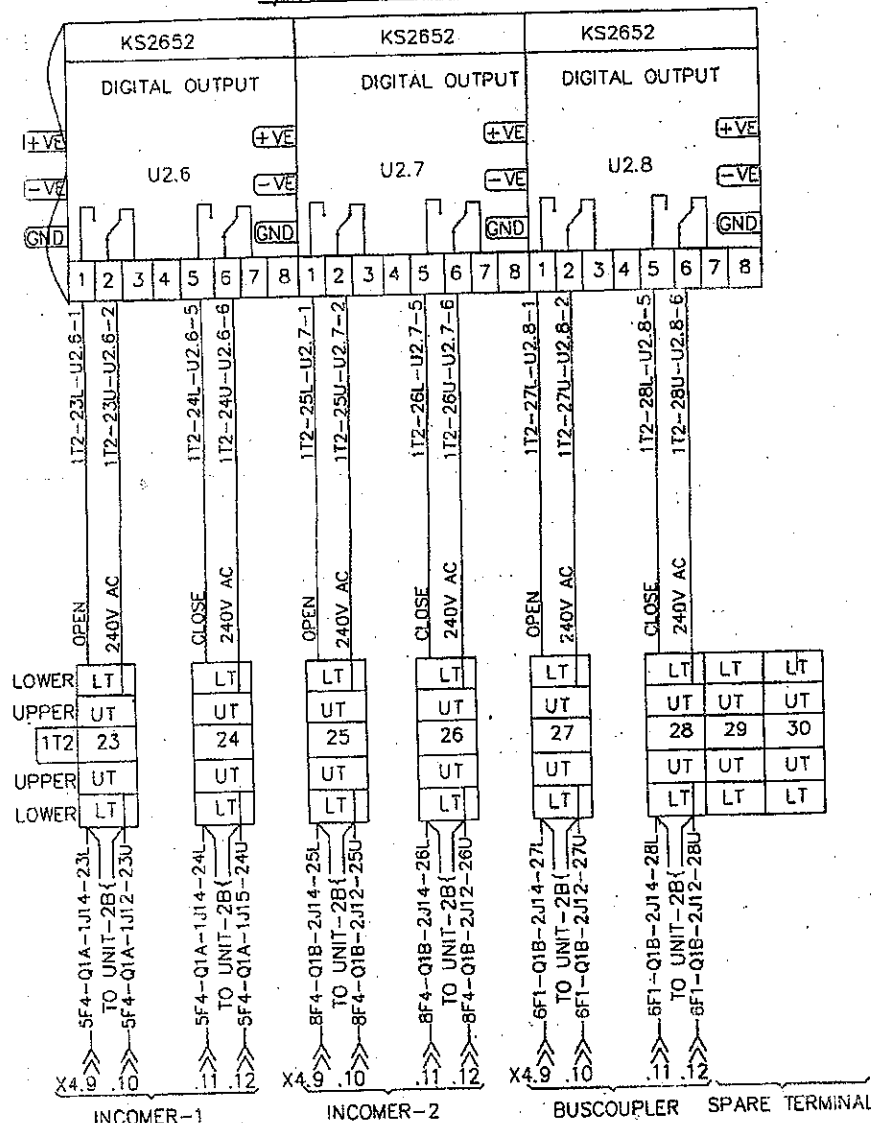
CUSTOMER:-	 पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड POWER GRID CORPORATION OF INDIA LIMITED. (A Government of India Enterprise)			
CONTRACTOR:-	BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION			
PROJECT:-	±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT			
CA NO.:-	C-61901R-S056-8/CA-II/3660 DATED 22.12.2011 FOR ON-SHORE SUPPLIES & C-61901R-S056-8/CA-IV/3662 DATED 22.12.2011 FOR SERVICES			
STATION:-	AGRA			
	MANUFACTURER:-	DRN.	NAME	SIGN
	Unilec Engineers Ltd. Begumpur Khatola Road, Behrampur Industrial Area, Gurgaon-122001	PRE.	S.S.GAUR	
		CHD.	D.KUMAR	
		APP.	K.C.BHATT	
BHEL DRG. No.	-----		REV.	---
DOCUMENT TITLE:-	SCH. DIA. FOR 415V MCC BECKHOFF I/O UNIT			
UEL DRG. No.	J-673-401-08		SHEET NO.	01 OF 23



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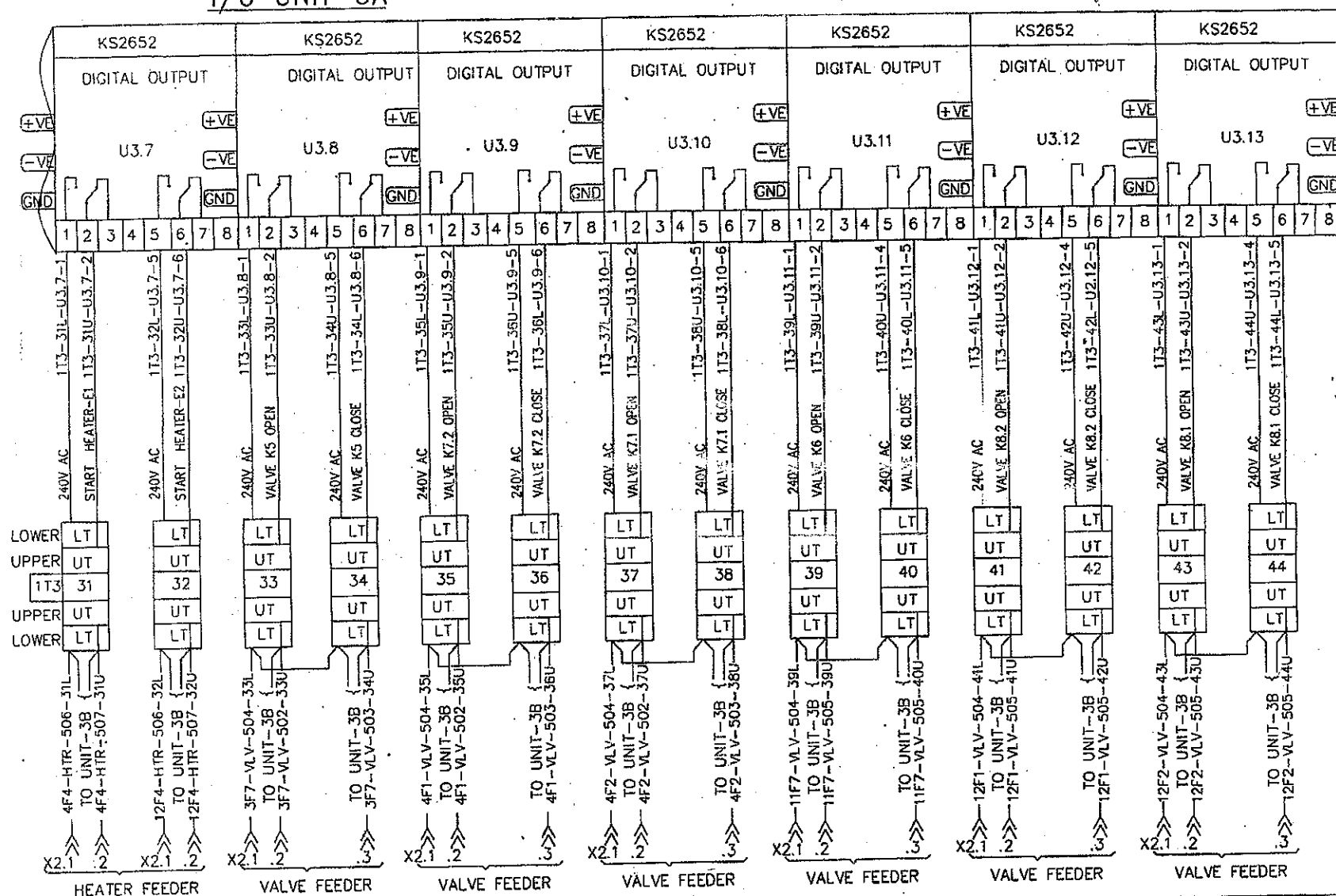
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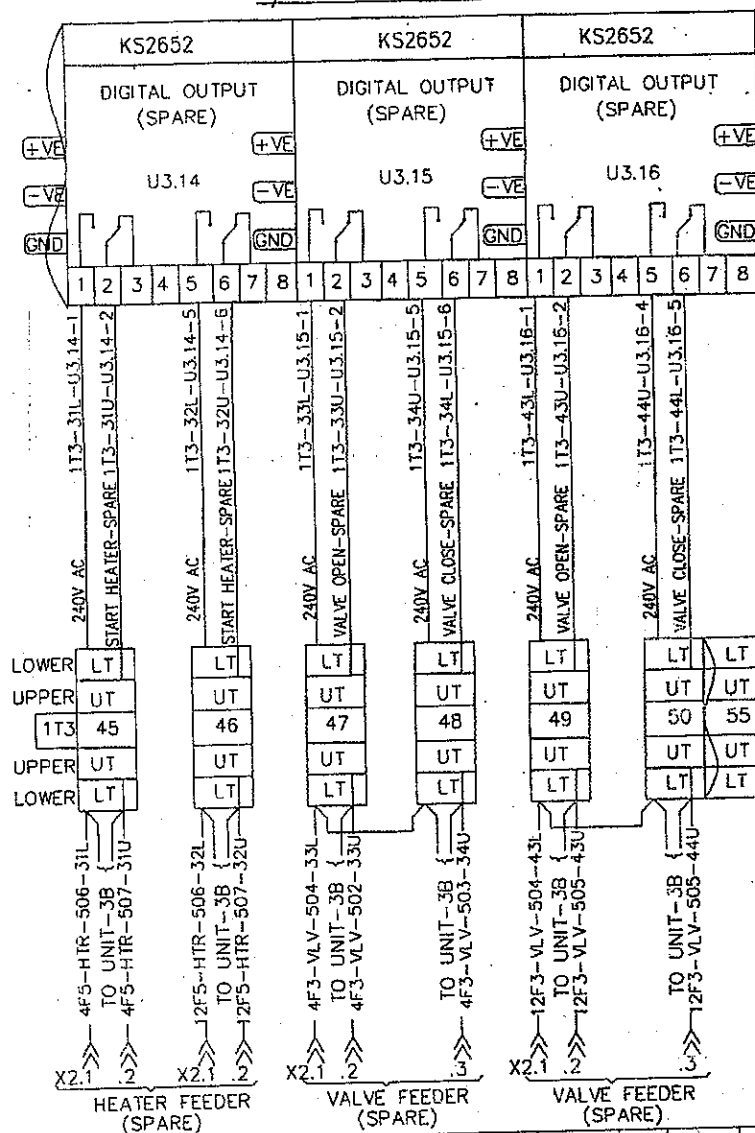


REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	DRN.	NAME	SIGN	Manufacturer:-	CUSTOMER:-	DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD.	D.KUMAR	PRPD.	S.S.GAUR		UNILEC ENGINEERS LTD.	POWER GRID CORPORATION OF INDIA LIMITED.	DETAILS	SCHEMATIC DIAGRAM
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT				UNILEC ENGINEERS LTD.	SHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	SHEL DRG. No.	REV:- -
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013				UNILEC ENGINEERS LTD.	PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT	UEL DRG. No.	REV:- R3
									UNILEC ENGINEERS LTD.		SHEET NO.	03 OF 23

1/0 UNIT-3A

[illegible]

I/O UNIT-3A



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REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD. D.RUMAR	
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD. K.C.BHATT	
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE 04.10.2013	

Manufacturer:-
UNILEC
 UNILEC ENGINEERS LTD.
 UNIT-1- Begumpur Kholab Road,
 Baharapur Industrial Area,
 Gurgaon-122001
 UNIT-2- Basol Distt. Haryana

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
 CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
 TRANSMISSION PROJECTS DIVISION
 PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
 HER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT		
DETAILS	SCHEMATIC DIAGRAM		
BHEL DRG. No.	--		REV. - -
UEL DRG. No.	J-573-401-08		REV.:- R3
SHEET NO.	05 OF 23		

FOR NETWORK

5 PIN CONNECTOR

I/O UNIT-4A

1	2	3	4	5	KS1408				KS1408				KS1408				KS1408			
BK5120					DIGITAL INPUT				DIGITAL INPUT				DIGITAL INPUT				DIGITAL INPUT			
CANOPEN (+VE)					(+VE)				(+VE)				(+VE)				(+VE)			
BUSCOUPLER (-VE)					(-VE)				(-VE)				(-VE)				(-VE)			
U4.1 GND					U4.2 GND				U4.3 GND				U4.4 GND				U4.5 GND			
24V	0V				1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8

J3A J4A
FROM U3.1
ZONE -41

24V(+VE) J3

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	1T4	1	2	3	4	5
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT

1F1-VCF-101-2U	1F2-VCF-101-2U	1F1-VCF-102-2U	TO UNIT-4B1	1F1-VCF-103-2U	1F2-VCF-102-3U	1F2-VCF-103-3U	1F3-VCF-102-3U	TO UNIT-4B1	1F3-VCF-103-3U	TO UNIT-4B1	1F3-VCF-102-3U	1F3-VCF-103-3U	TO UNIT-4B1	1F3-VCF-101-6U	1F4-VCF-101-6U
X2.5	5	6	7	6	6	7	6	7	6	7	6	7	6	5	5

FAN FEEDER

24V(+VE) J3

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	7	8	9	10	11	12
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT

9F1-VCF-101-6U	9F2-VCF-101-6U	9F1-VCF-102-7U	TO UNIT-4B1	9F1-VCF-103-7U	9F2-VCF-102-8U	9F2-VCF-103-8U	9F3-VCF-102-9U	TO UNIT-4B1	9F3-VCF-103-9U	9F4-VCF-102-10U	TO UNIT-4B1	9F4-VCF-103-10U	9F3-VCF-101-11U	9F4-VCF-101-11U
X2.5	5	6	7	6	7	6	7	6	7	6	7	6	5	5

FAN FEEDER

24V(+VE) J3

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	13	14	15	16	17	18
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT

1F6-VCF-101-12U	1F7-VCF-101-12U	1F6-VCF-102-13U	TO UNIT-4B1	1F6-VCF-103-13U	1F7-VCF-102-14U	1F7-VCF-103-14U	2F1-VCF-102-14U	TO UNIT-4B1	2F1-VCF-103-14U	2F2-VCF-102-14U	TO UNIT-4B1	2F2-VCF-103-14U	2F1-VCF-101-17U	2F2-VCF-101-17U
X2.5	5	6	7	6	7	6	7	6	7	6	7	6	5	5

FAN FEEDER

24V(+VE) J3

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	19	20	21	22	23	24
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT

9F6-VCF-101-18U	TO UNIT-4B1	9F7-VCF-101-18U	9F6-VCF-102-19U	TO UNIT-4B1	9F6-VCF-103-19U	9F7-VCF-102-20U	TO UNIT-4B1	9F7-VCF-103-20U	TO UNIT-4B1	9F7-VCF-102-21U	TO UNIT-4B1	9F7-VCF-103-21U	9F6-VCF-102-22U	TO UNIT-4B1	9F6-VCF-103-22U	9F7-VCF-101-23U	9F6-VCF-101-23U
X2.5	5	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	5

FAN FEEDER

REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G		
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G		
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G		

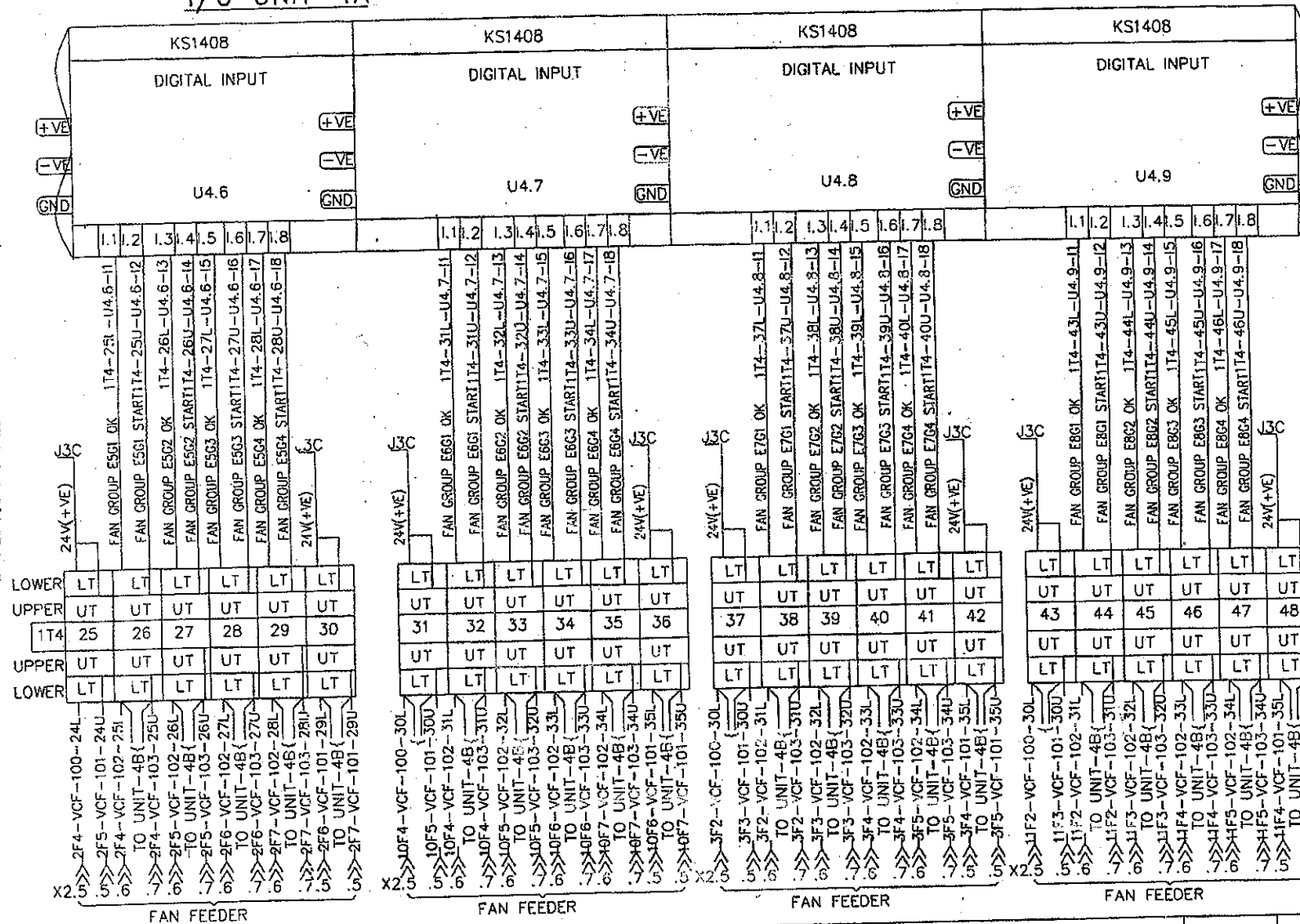
Manufacturer:-
UNILEC
UNILEC ENGINEERS LTD.
UNIT-1-Begumpur Khakho Road,
Begumpur Industrial Area,
Gurgaon-122001
UNIT-2-Bawal Distt. Rewari

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION
PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-I PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT	
DETAILS	SCHEMATIC DIAGRAM	
BHEL DRG. No.	--	REV:- -
UEL DRG. No.	J-673-401-08	REV:- R3
SHEET NO.	07 OF 23	

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I/O UNIT-4A



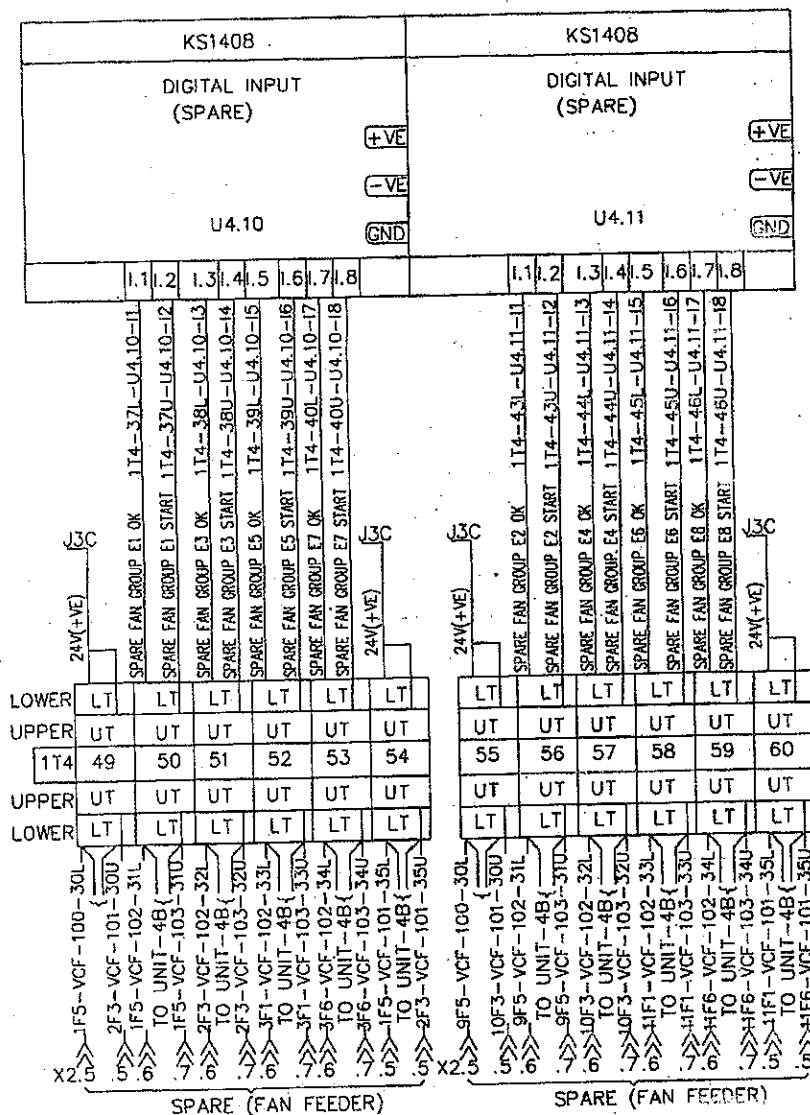
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R3	REVISED AS PER POWERGRID COMM. DT.24.31.14	29.01.14	S.S.G	CHKO	K.KUMAR
R2	REV. AS PER COMM. DT.27 & DISC. 29.1.13	29.11.13	S.S.G	APPD	K.C.BHATT
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013

ORN.	NAME	SIGN
PRPD.	S.S.GAUR	
CHKO.	K.KUMAR	
APPD.	K.C.BHATT	

Manufacturer:-	CUSTOMER:-
UNILEC ENGINEERS LTD.	POWER GRID CORPORATION OF INDIA LIMITED.
UNIT-1:- Begunpur Khilola Road,	CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
Bahrampur Industrial Area,	TRANSMISSION PROJECTS DIVISION
Gurgaon-122001	PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
UNIT-2:- Bawal Dist. Rawari	NER/ER-MR/WR INTERCONNECTOR-I PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT
DETAILS	SCHEMATIC DIAGRAM
BHEL DRG. No.	---
UCL DRG. No.	J-673-401-08
SHEET NO.	08 OF 23

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REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD. D.KUMAR	
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD. K.C.BHATT	
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE 04.10.2013	
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS

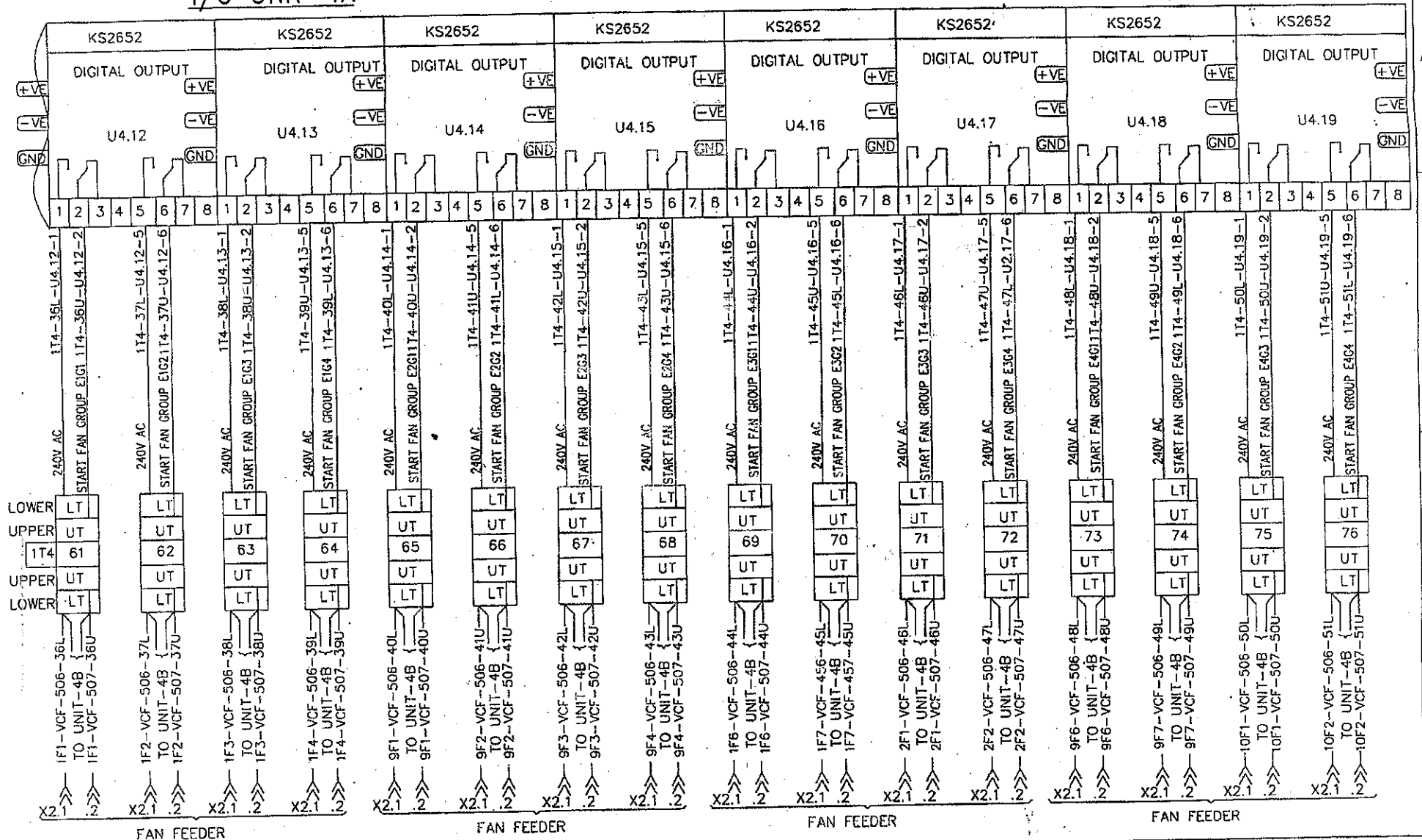
Manufacturer:-
UNILEC
 UNILEC ENGINEERS LTD.
 UNIT-1:- Begunpur Khata Road,
 Behrampur Industrial Area,
 Gurgaon-122001
 UNIT-2:- Gawal Diall, Rewari

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
 CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
 TRANSMISSION PROJECTS DIVISION
 PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
 NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT		
DETAILS	SCHEMATIC DIAGRAM		
QHEL DRG. No.	--	REV.:	--
UEL DRG. No.	J-673-401-08	REV.:	-- R3
SHEET NO.	09 OF 23		

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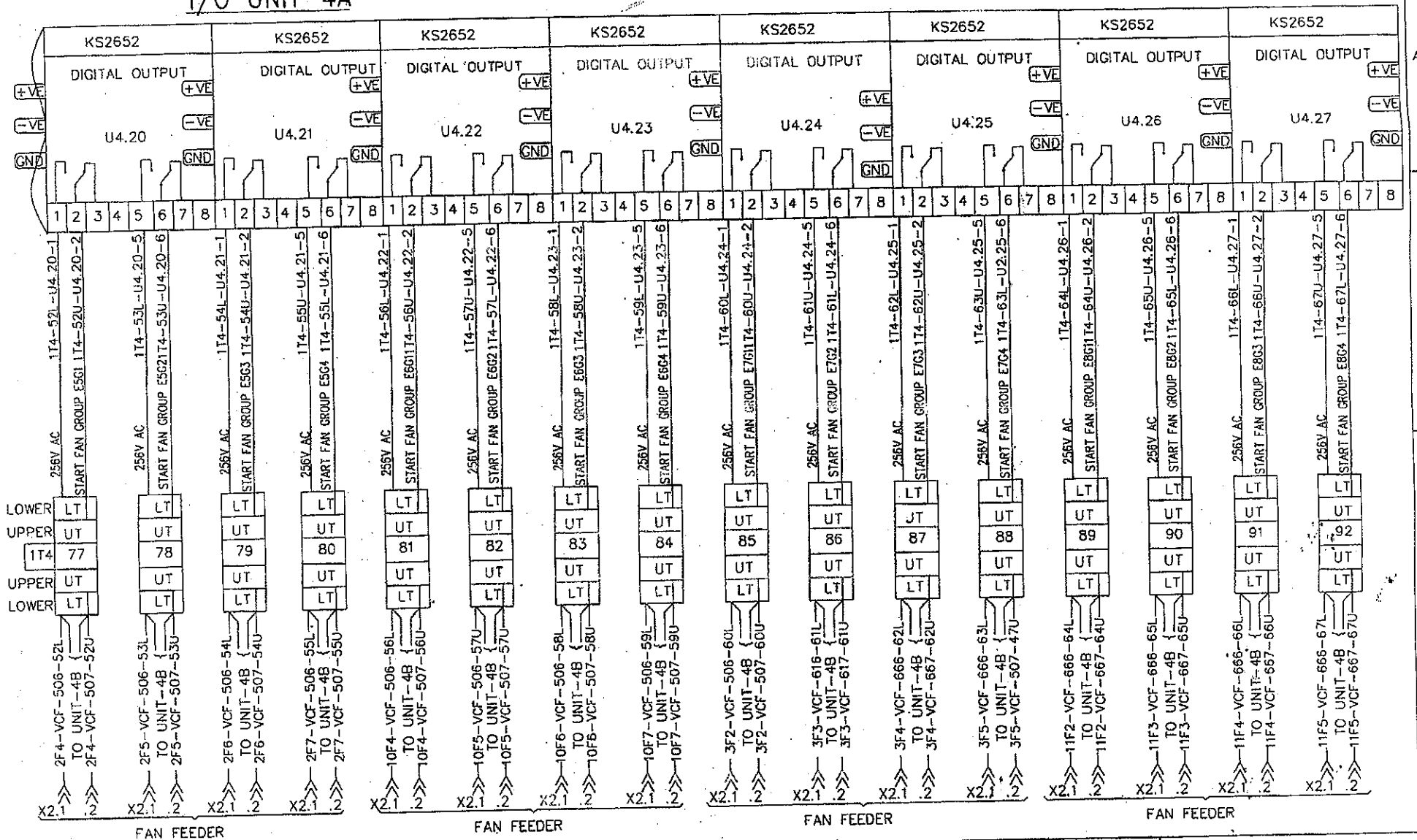
I/O UNIT-4A



REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	DRN.	NAME	SIGN	Manufacturer:-	CUSTOMER:-	DESCRIPTION	DETAILS	BHEL DRG. No.	REV:-
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G.	CHKD.	S.S.GAUR	PRPD.	S.S.GAUR		UNILEC ENGINEERS LTD.	POWER GRID CORPORATION OF INDIA LIMITED.	415V ACDB WITH BECKHOFF I/O UNIT	SCHEMATIC DIAGRAM	--	--
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G.	APPD.	K.C.BHATT	CHKD.	D.KUMAR		UNIT-1-Bagunpur Khola Road,	CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.				
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G.	DATE	04.10.2013				Bagunpur Industrial Area,	TRANSMISSION PROJECTS DIVISION				
									Gurgaon-122001	PROJECT:- 3800KV, 6000MW, HVDC MULTI-TERMINAL			J-673-401-08	REV:- R3
									UNIT-2-Bawal Distl. Rewari	NER/ER-NR/WR INTERCONNECTOR-I PROJECT			10 OF 23	

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I/O UNIT-4A



REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	Manufacturer:- UNILEC UNILEC ENGINEERS LTD. UNIT-11-Bangalore Industrial Area, Bangalore-560001 UNIT-2-Bangalore Dist. Road	CUSTOMER:- POWER GRID CORPORATION OF INDIA LIMITED. CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION PROJECT:- 800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT	DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT
3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	PRPD.	S.S.GAUR			DETAILS	SCHEMATIC DIAGRAM
2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	CHKD.	C.KUMAR			BHEL DRG. No.	---
1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	APPD.	K.C.BHATT			UCL DRG. No.	J-673-401-08
								SHEET NO.	11 OF 23

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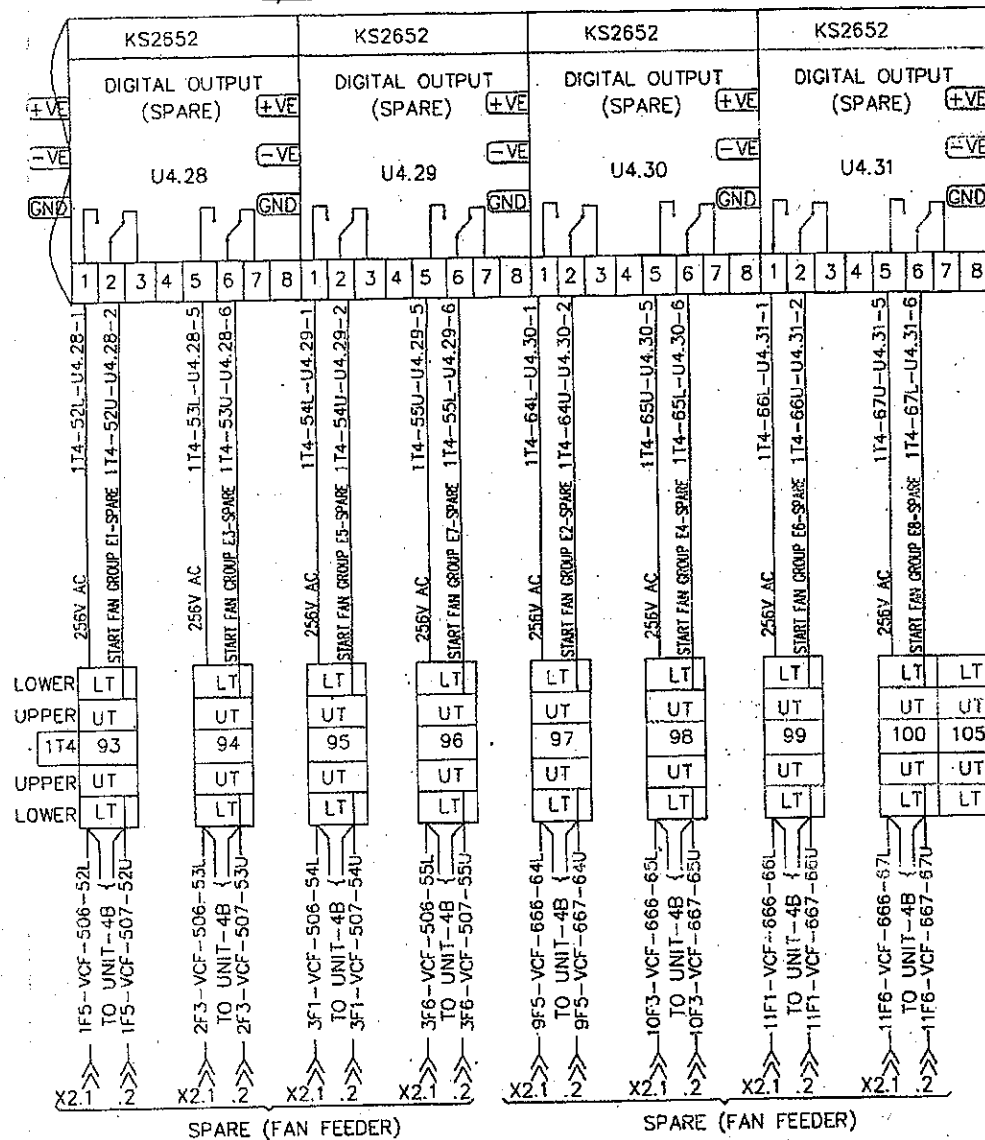
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I/O UNIT-4A



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REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G		
2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G		
1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G		

Manufacturer:-
UNILEC
 UNILEC ENGINEERS LTD.
 UNIT-11-Boguspur Khole Road,
 Beharapur Industrial Area,
 Gurgaon-122001
 UNIT-2-Bawal Dist. Rewari

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
 CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
 TRANSMISSION PROJECTS DIVISION
 PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
 NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT		
DETAILS	SCHEMATIC DIAGRAM		
BHEL DRG. No.	--	REV.:-- --	
UEL DRG. No.	J-673-401-08	REV.:-- R3	
SHEET NO.	12 OF 23		

FOR NETWORK

5 PIN CONNECTOR

I/O UNIT-3B

1	2	3	4	5	KS1408	KS1408	KS1408	KS1408	KS1408
BK5120 CANOPEN BUSCOUPLER U3.1 GND					DIGITAL INPUT U3.2 GND	DIGITAL INPUT U3.3 GND	DIGITAL INPUT U3.4 GND	DIGITAL INPUT U3.5 GND	DIGITAL INPUT U3.6 GND
+VE -VE					+VE -VE	+VE -VE	+VE -VE	+VE -VE	+VE -VE

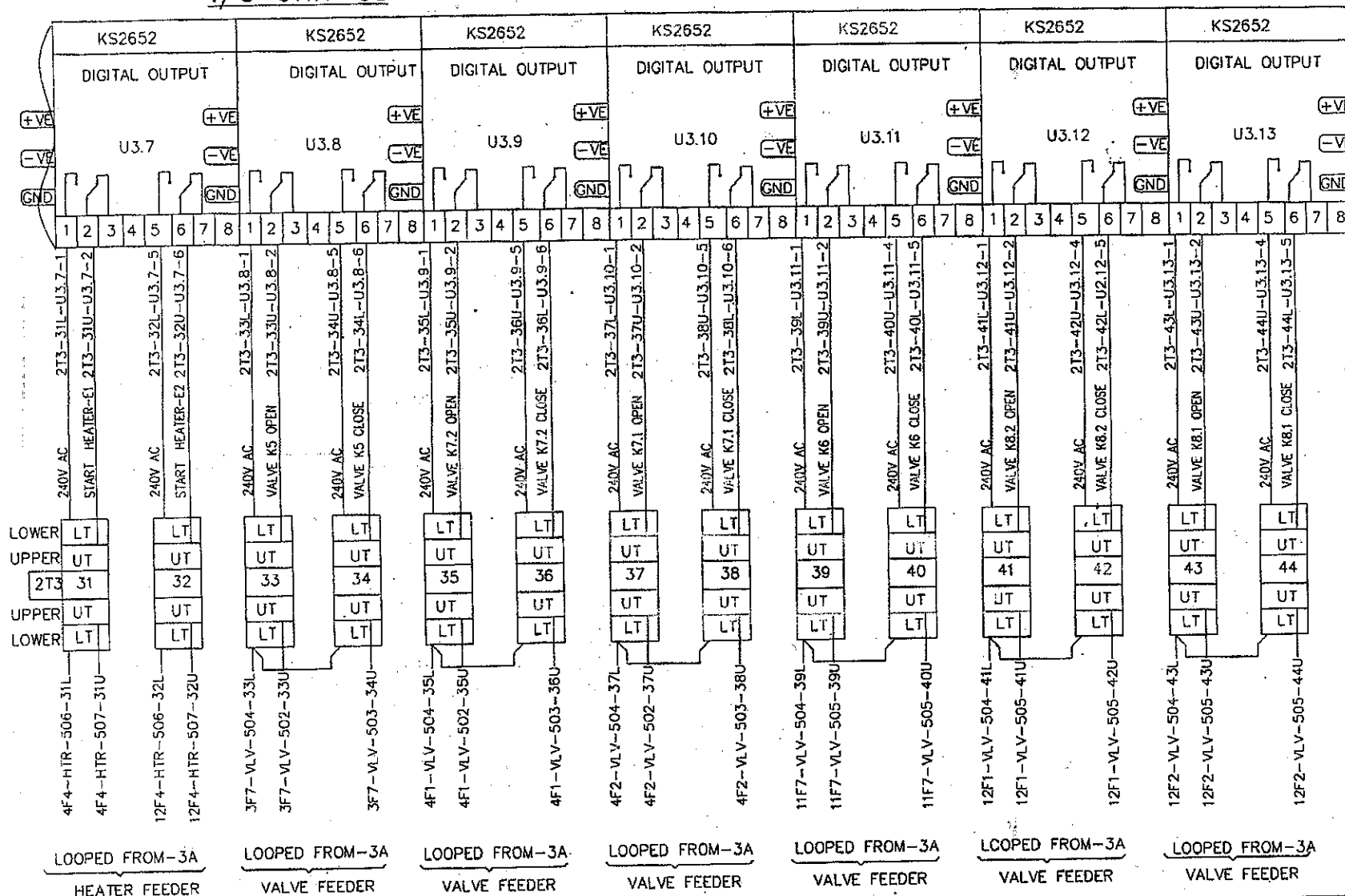
24V		OV		J3B		J4B		TO U4.1 ZONE-141		FROM U2.1 ZONE-101		24V(+VE) J3C		LOWER		UPPER		UPPER		LOWER		4F4-HTR-101-21		2F4-HTR-101-20		4F4-HTR-102-21		4F4-HTR-103-20		2F4-HTR-102-31		2F4-HTR-103-30		4F5-HTR-102-21		4F5-HTR-103-20		2F5-HTR-102-21		2F5-HTR-103-20		3F7-VLV-100-61		3F7-VLV-101-60		3F7-VLV-102-71		3F7-VLV-103-70		3F7-VLV-104-81		4F1-VLV-102-91		4F1-VLV-103-90		4F1-VLV-104-101		4F1-VLV-100-111		4F1-VLV-101-110		4F2-VLV-100-121		4F2-VLV-101-120		4F2-VLV-102-131		4F2-VLV-103-130		4F2-VLV-104-141		4F3-VLV-100-121		4F3-VLV-101-120		4F3-VLV-102-131		4F3-VLV-103-130		4F3-VLV-104-141		11F7-VLV-100-181		11F7-VLV-101-180		11F7-VLV-102-191		11F7-VLV-103-190		11F7-VLV-104-201		12F1-VLV-102-211		12F1-VLV-103-210		12F1-VLV-104-221		12F1-VLV-100-231		12F1-VLV-101-230		12F2-VLV-100-241		12F2-VLV-101-240		12F2-VLV-102-251		12F2-VLV-103-250		12F2-VLV-104-261		12F3-VLV-100-121		12F3-VLV-101-120		12F3-VLV-102-131		12F3-VLV-103-130		12F3-VLV-104-141																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
HEATER-A OK		HEATER-A ON		HEATER-B OK		HEATER-B ON		SPARE (HEATER-A OK)		SPARE (HEATER-A ON)		SPARE (HEATER-B OK)		SPARE (HEATER-B ON)		24V(+VE)		24V(-VE)		VALVE K5 OK		VALVE K5 OPEN		VALVE K5 CLOSE		SPARE		VALVE K7.2 OK		VALVE K7.2 OPEN		VALVE K7.2 CLOSE		SPARE		24V(+VE)		24V(-VE)		24V(+VE)		24V(-VE)		VALVE K7.1 OK		VALVE K7.1 OPEN		VALVE K7.1 CLOSE		SPARE		SPARE (VALVE OK)		SPARE (VALVE OPEN)		SPARE (VALVE CLOSE)		SPARE		24V(+VE)		24V(-VE)		24V(+VE)		24V(-VE)		VALVE K8 OK		VALVE K8 OPEN		VALVE K8 CLOSE		SPARE		24V(+VE)		24V(-VE)		24V(+VE)		24V(-VE)		VALVE K8.1 OK		VALVE K8.1 OPEN		VALVE K8.1 CLOSE		SPARE		SPARE (VALVE OK)		SPARE (VALVE OPEN)		SPARE (VALVE CLOSE)		SPARE		24V(+VE)		24V(-VE)		24V(+VE)		24V(-VE)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
213-21-U3.2-11		213-20-U3.2-12		213-31-U3.2-13		213-30-U3.2-14		213-41-U3.2-15		213-40-U3.2-16		213-51-U3.2-17		213-50-U3.2-18		213-71-U3.3-11		213-70-U3.3-12		213-81-U3.3-13		213-80-U3.3-14		213-91-U3.3-15		213-90-U3.3-16		213-101-U3.3-17		213-100-U3.3-18		213-131-U3.4-11		213-130-U3.4-12		213-141-U3.4-13		213-140-U3.4-14		213-151-U3.4-15		213-150-U3.4-16		213-161-U3.4-17		213-160-U3.4-18		213-191-U3.5-11		213-190-U3.5-12		213-201-U3.5-13		213-200-U3.5-14		213-211-U3.5-15		213-210-U3.5-16		213-221-U3.5-17		213-220-U3.5-18		213-251-U3.6-11		213-250-U3.6-12		213-261-U3.6-13		213-260-U3.6-14		213-271-U3.6-15		213-270-U3.6-16		213-281-U3.6-17		213-280-U3.6-18																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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LOOPED FROM-3A LOOPED FROM-3A LOOPED FROM-3A LOOPED FROM-3A LOOPED FROM-3A LOOPED FROM-3A LOOPED FROM-3A LOOPED FROM-3A
 HEATER FEEDER SPARE (HEATER I/P) VALVE FEEDER VALVE FEEDER VALVE FEEDER SPARE (VALVE INPUT) VALVE FEEDER VALVE FEEDER VALVE FEEDER SPARE (VALVE INPUT)

				DRN	NAME	SIGN	Manufacturer:-	CUSTOMER:-	DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT
				PRPD	S.S.GAUR		UNILEC	POWER GRID CORPORATION	DETAILS	SCHEMATIC DIAGRAM
				CHKD	D.KUMAR		UNILEC ENGINEERS LTD.	CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.	BHEL DRG. No.	---
				APPD	K.C.BHATT		UNIT-1:- Begumpur Khola Road, Surgeon-122501	TRANSMISSION PROJECTS DIVISION	UCL DRG. No.	J-673-401-08
				DATE	04.10.2013		UNIT-2:- Bawal Dist. Rewari	PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-1 PROJECT	SHEET NO.	15 OF 23
REV	DESCRIPTION OF CHANGE			DATE	SIGN	SCALE	NTS			REV:- R3

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I/O UNIT-3B



REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKO.	D.KUMAR
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013

Manufacturer:-
UNILEC
 UNILEC ENGINEERS LTD.
 UNIT-1:-Sanganpur Khola Road,
 Barampur Industrial Area,
 Gurgaon-122001
 UNIT-2:-Bawal Dist. Rewari

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
 CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
 TRANSMISSION PROJECTS DIVISION
 PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
 NER/ER-NR/WR INTERCONNECTOR-I PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT		
DETAILS	SCHEMATIC DIAGRAM		
BHEL DRG. No.	--	REV:- -	
UEL DRG. No.	J-673-401-08	REV:- R3	
SHEET NO.	16 OF 23		

171

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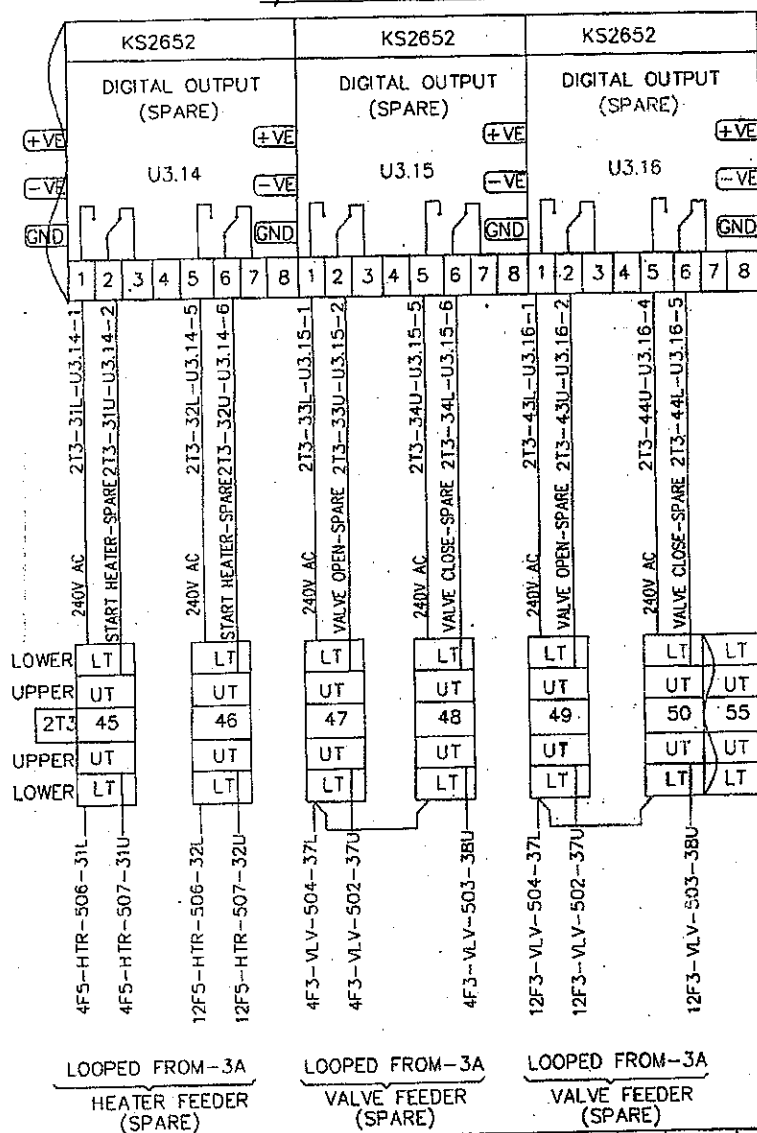
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I/O UNIT-3A



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REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	PRPD.	S.S.GAUR
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	CHKD.	D.KUMAR
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	APPD.	K.C.BHATT

Manufacturer:-
UNILEC
 UNILEC ENGINEERS LTD.
 UNIT-1:- Begumpur Khosla Road,
 Behrampur Industrial Area,
 Gurgaon-122001
 UNIT-2:- Gurgaon Distt, Rewari

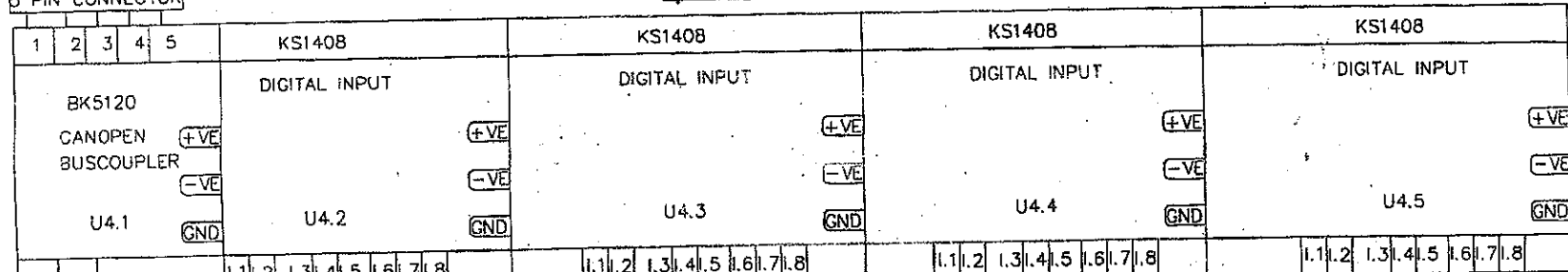
CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
 CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
 TRANSMISSION PROJECTS DIVISION
 PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
 NER/ER-NR/WR INTERCONNECTOR-I PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT		
DETAILS	SCHEMATIC DIAGRAM		
BHEL DRG. No.	--	REV.:-	--
UEL DRG. No.	J-673-401-08	REV.:-	R3
SHEET NO.	17 OF 23		

FOR NETWORK

5 PIN CONNECTOR

I/O UNIT-4B



J3B J4B
FROM U3.1
ZONE-121

24V(+VE) J3C

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	2T4	1	2	3	4	5
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT
	1F1-VCF-101-2L	1F2-VCF-101-2U	1F1-VCF-102-2L	1F1-VCF-103-2U	1F2-VCF-102-3L	1F2-VCF-103-3U
	1F3-VCF-102-3L	1F3-VCF-103-3U	1F3-VCF-102-3L	1F3-VCF-103-3U	1F3-VCF-101-6L	1F4-VCF-101-6U

LOOPED FROM-4A
FAN FEEDER

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	7	8	9	10	11	12
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT
	9F1-VCF-101-6L	9F2-VCF-101-6U	9F1-VLV-102-7L	9F1-VCF-103-7U	9F2-VCF-102-8L	9F2-VCF-103-8U
	9F3-VCF-102-9L	9F3-VCF-103-9U	9F4-VCF-102-10L	9F4-VCF-103-10U	9F3-VCF-101-11L	9F4-VCF-101-11U

LOOPED FROM-4A
FAN FEEDER

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	13	14	15	16	17	18
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT
	1F6-VCF-101-12L	1F7-VCF-101-12U	1F6-VCF-102-13L	1F6-VCF-103-13U	1F7-VCF-102-14L	1F7-VCF-103-14U
	2F1-VCF-102-14L	2F1-VCF-103-14U	2F2-VCF-102-14L	2F2-VCF-103-14U	2F1-VCF-101-17L	2F2-VCF-101-17U

LOOPED FROM-4A
FAN FEEDER

LOWER	LT	LT	LT	LT	LT	LT
UPPER	UT	UT	UT	UT	UT	UT
	19	20	21	22	23	24
UPPER	UT	UT	UT	UT	UT	UT
LOWER	LT	LT	LT	LT	LT	LT
	9F6-VCF-101-18L	9F7-VCF-101-18U	9F6-VCF-102-19L	9F6-VCF-103-19U	9F7-VCF-102-20L	9F7-VCF-103-20U
	10F1-VCF-102-21L	10F1-VCF-103-21U	10F2-VCF-102-22L	10F2-VCF-103-22U	10F1-VCF-101-23L	10F2-VCF-101-23U

LOOPED FROM-4A
FAN FEEDER

REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	DRN	NAME	SIGN
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKO	S.S.GAUR		
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD	K.C.BHATT		
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013		
					NTS		

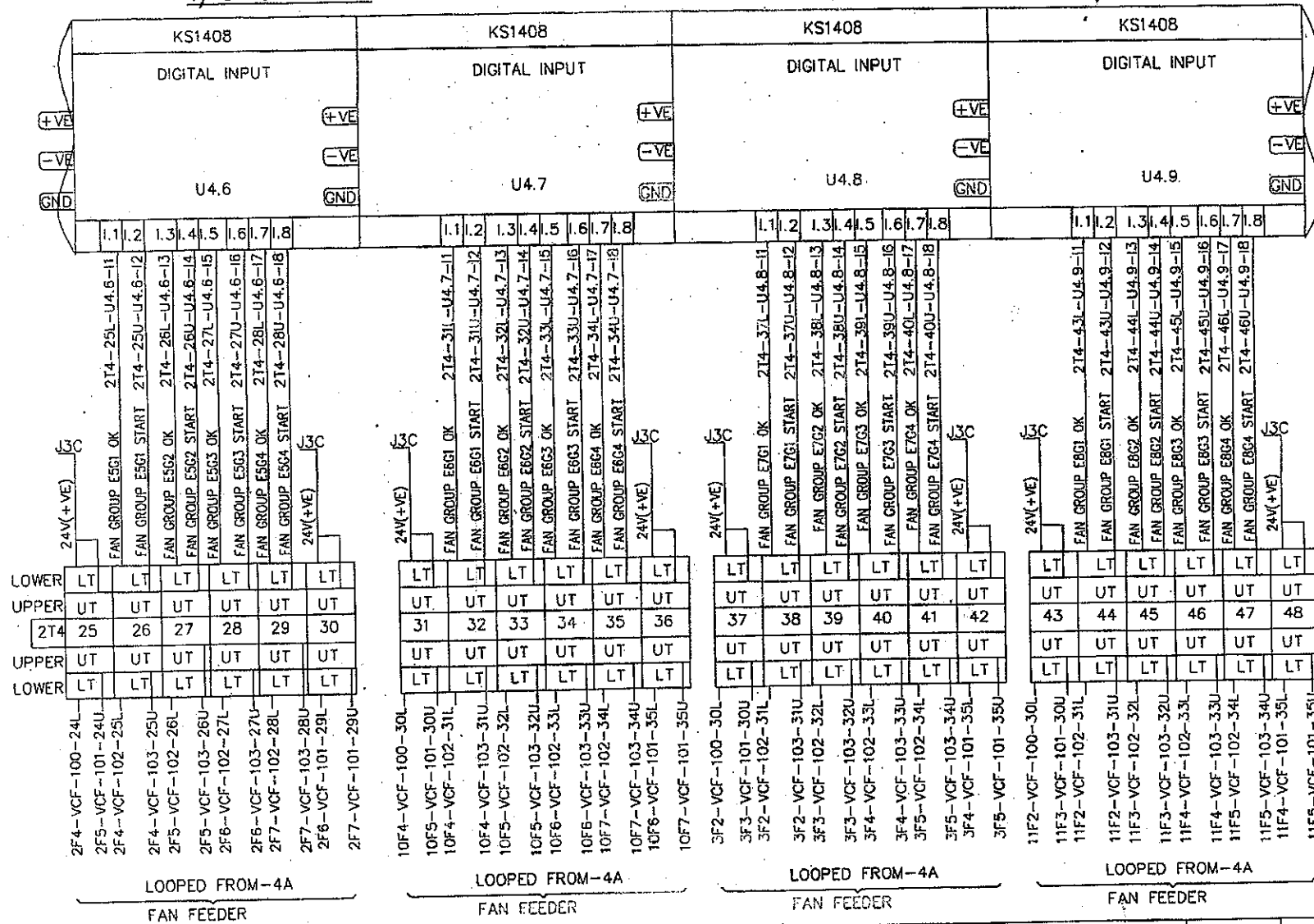
Manufacturer:-
UNILEC
UNILEC ENGINEERS LTD.
UNIT-1, Begumpur Khadda Road,
Behrempur Industrial Area,
Burguen-122001
UNIT-2-Bawal Dist. Rewari

CUSTOMER:-
POWER GRID CORPORATION OF INDIA LIMITED.
CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION
PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-1 PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT	
DETAILS	SCHEMATIC DIAGRAM	
BHEL DRG. No.	---	REV.: - -
UEL DRG. No.	J-673-401-08	REV.: - R3
SHEET NO.	18 OF 23	

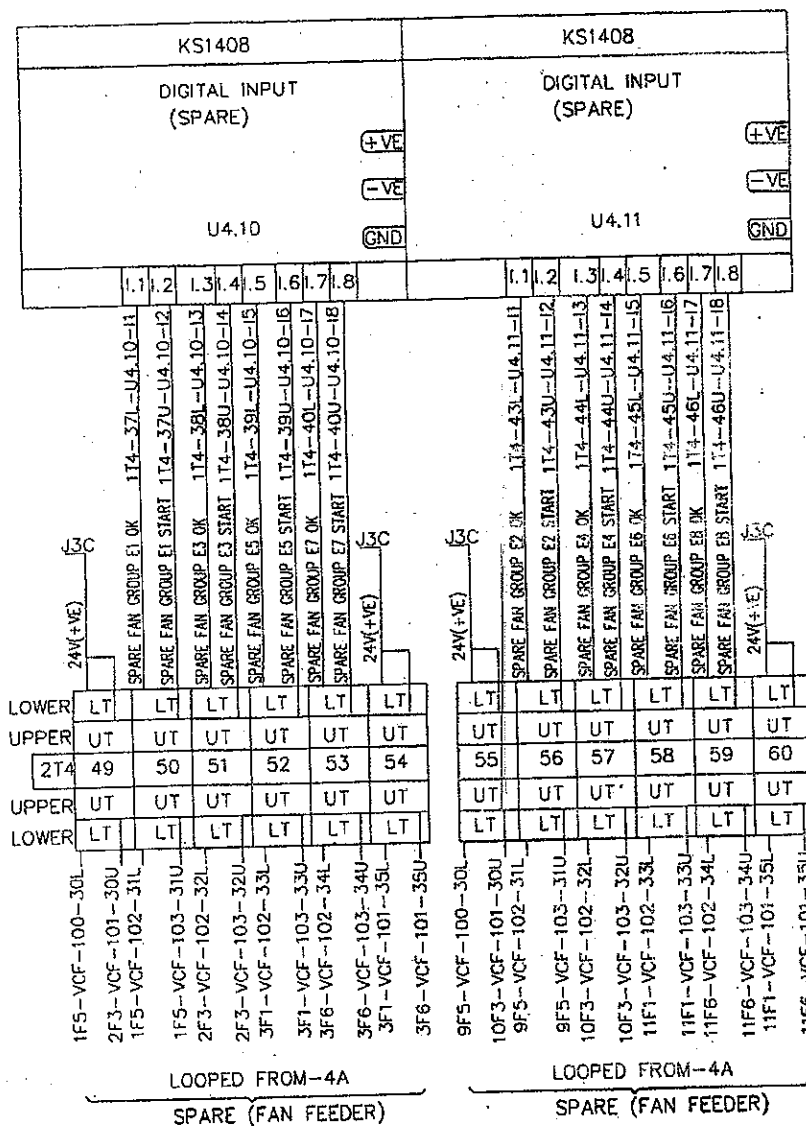
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I/O UNIT-4B



REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	Manufacturer:- UNILEC ENGINEERS LTD. UNIT-1:-Bogumpur Khokola Road, Bahrampur Industrial Area, Gurgaon-122001 UNIT-2:-Bawal Distt. Rewari	CUSTOMER:- POWER GRID CORPORATION OF INDIA LIMITED. (Government of India) CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT	DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD.	D.KUMAR			DETAILS	SCHEMATIC DIAGRAM
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT			BHEL DRG. No.	---
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013			UCL DRG. No.	J-673-401-08
								SHEET NO.	19 OF 23

REV:- -
REV:- R3



					DRP.	NAME	SIGN
					PRPD.	S.S.GAUR	
P3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD.	D.KUMAR		
P2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT		
P1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013		
REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS		

Manufacturer:--
UNILEC
UNILEC ENGINEERS LTD
UNIT-1:- Begunpur Khata Road,
Behrangpur Industrial Area,
Gurgaon-122001
UNIT-2:- Bawal Dist. Rawari

CUSTOMER:-  **POWER GRID CORPORATION OF INDIA LIMITED.**
(a Government of India Company)

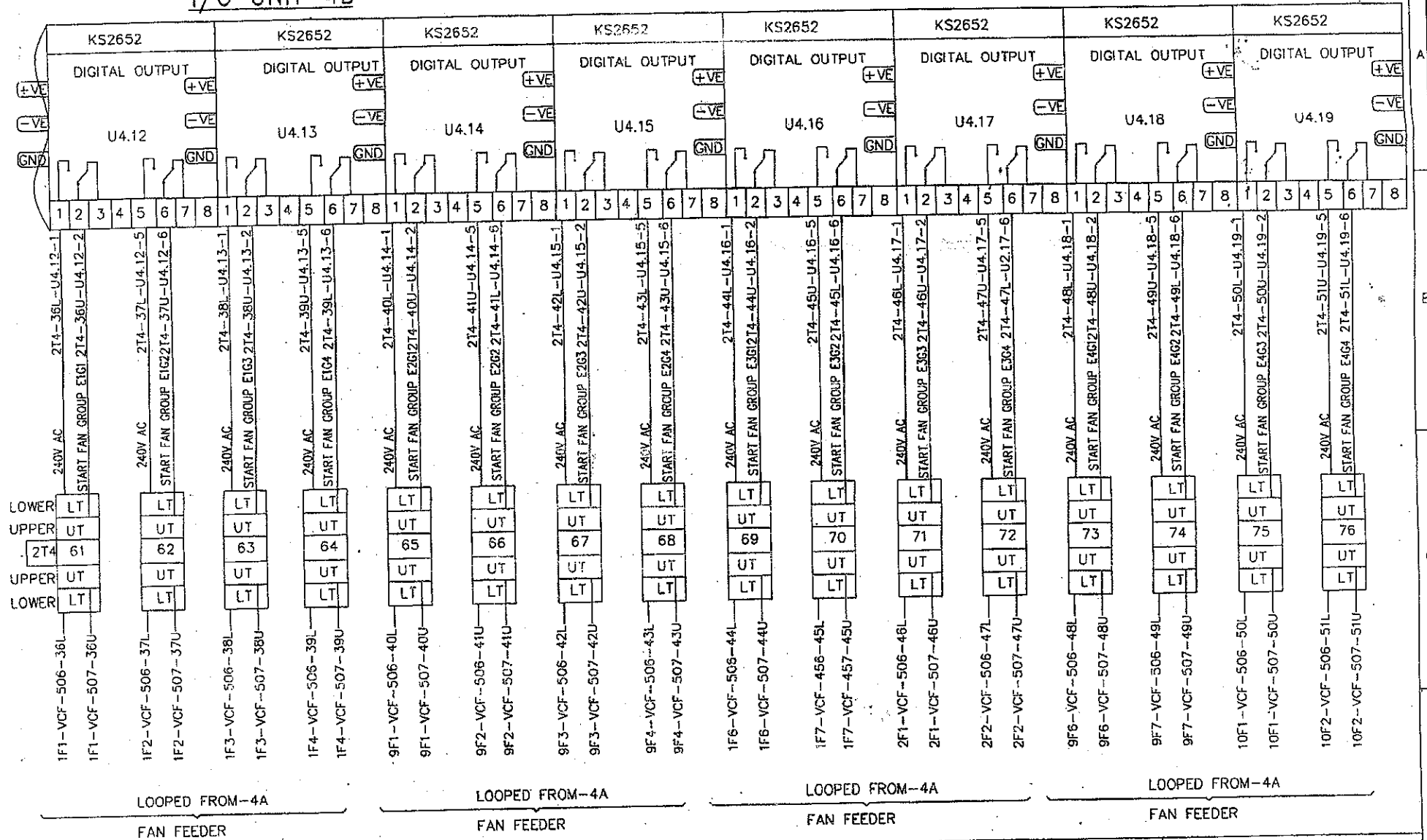
CONTRACTOR:- **BHARAT HEAVY ELECTRICALS LTD.**
TRANSMISSION PROJECTS DIVISION

PROJECT:- **±800KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-1 PROJECT**

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT		
DETAILS	SCHEMATIC DIAGRAM		
BHEL DRG. No.	---	REV.: - -	
UEL DRG. No.	J-673-401-08	REV.: - R3	
SHEET NO.	20 OF 23		

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I/O UNIT-4B



REV.	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	Manufacturer:- UNILEC ENGINEERS LTD. UNIT-1:- Begumpur Khatola Road, Behrampur Industrial Area, Gurgaon-122001 UNIT-2:- Basal Dist. Rowal	CUSTOMER:- POWER GRID CORPORATION OF INDIA LIMITED. CONTRACTOR:- SHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT	DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT
1	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHD.	O.KUMAR			DETAILS	SCHEMATIC DIAGRAM
2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT			BHEL DRG. No.	--
3	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DARE	04.10.2013			UEL DRG. No.	J-673-401-08
								SHEET NO.	21 OF 23

REV:- R3

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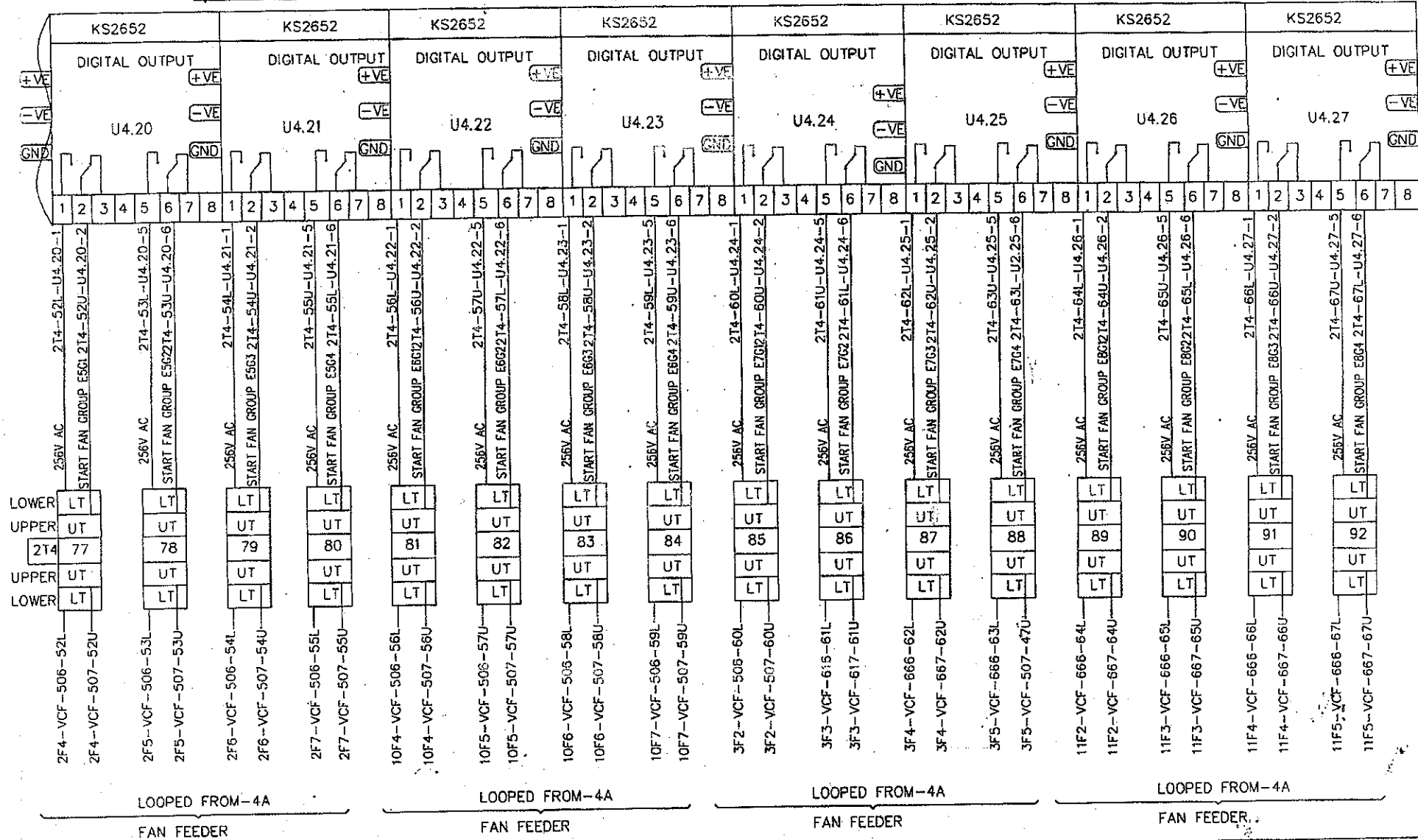
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I/O UNIT-4B



REVISION				DESCRIPTION OF CHANGE		DATE		SIGN		SCALE		NTS	
R3	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHKD.	D.KUMAR								
R2	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT								
R1	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013								
REV.													

Manufacturer:-

UNILEC

UNILEC ENGINEERS LTD.
UNIT-1-Bogumpur Khokha Road,
Bahampur Industrial Area,
Burgan-122001
UNIT-2-Sawal Distt. Rewari

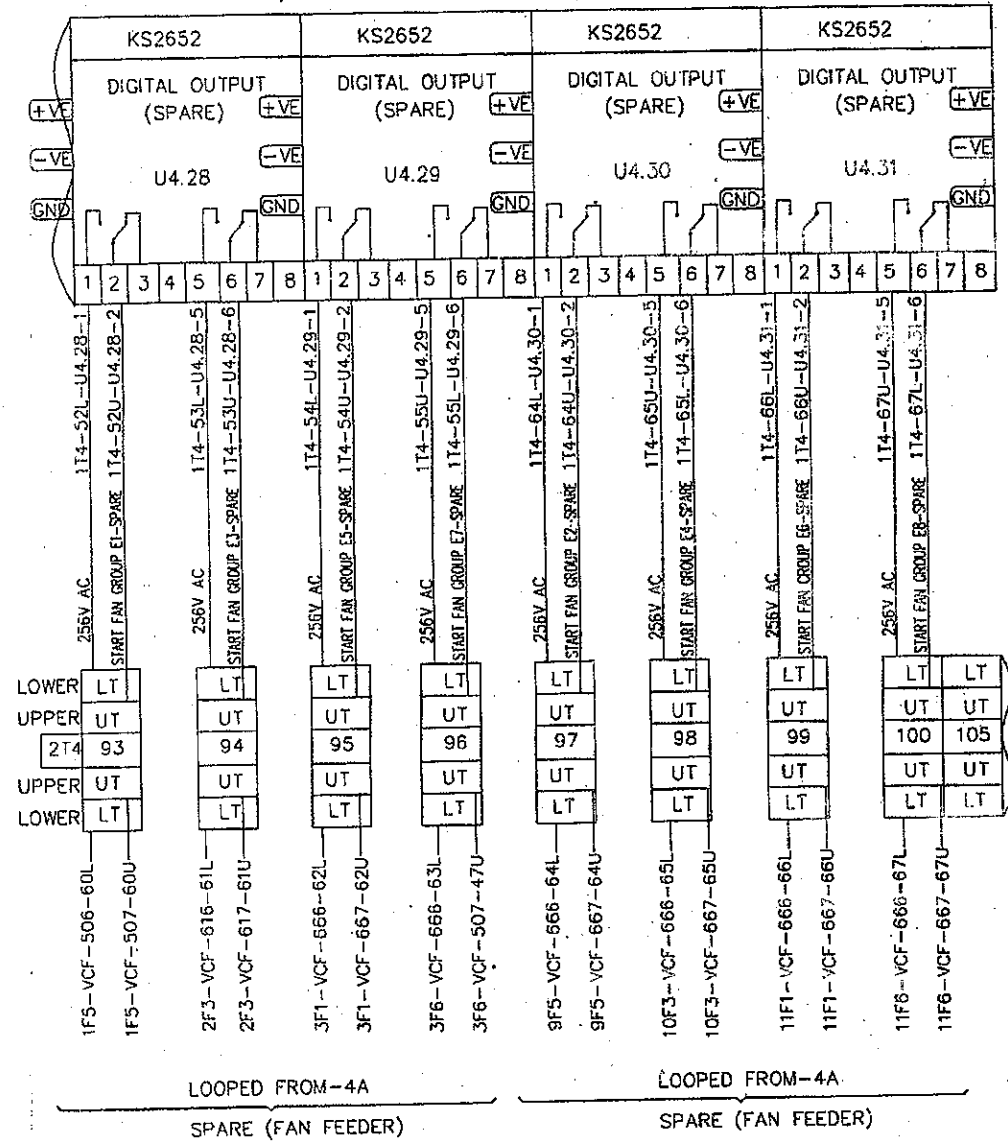
CUSTOMER:-

POWER GRID CORPORATION OF INDIA LIMITED.

CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION
PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-I PROJECT

DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT
DETAILS	SCHEMATIC DIAGRAM
BHEL DRG. No.	---
UCL DRG. No.	J-673-401-08
SHEET NO.	22 OF 23
REV.:-	R3

I/O UNIT-4A



LOOPED FROM-4A
SPARE (FAN FEEDER)

LOOPED FROM-4A
SPARE (FAN FEEDER)

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REV	DESCRIPTION OF CHANGE	DATE	SIGN	SCALE	NTS	Manufacturer:- UNILEC UNILEC ENGINEERS LTD. UNIT-1:- Begunpur Khola Road, Barampur Industrial Area, Gurgaon-122001 UNIT-2:- Road Chh. Road	CUSTOMER:- POWER GRID CORPORATION OF INDIA LIMITED. CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION PROJECT:- ±800KV, 6000MW, HVDC MULTI-TERMINAL NER/ER-NR/WR INTERCONNECTOR-I PROJECT	DESCRIPTION	415V ACDB WITH BECKHOFF I/O UNIT.
23	REVISED AS PER POWERGRID COMM. DT.24.01.14	29.01.14	S.S.G	CHRD.	D.KUMAR			DETAILS	SCHEMATIC DIAGRAM
22	REV. AS PER COMM. DT.27 & DISC. 29.11.13	29.11.13	S.S.G	APPD.	K.C.BHATT			BHEL DRG. No.	---
21	REVISED AS PER CLIENT COMM. DT.11.11.13	12.11.13	S.S.G	DATE	04.10.2013			UCL DRG. No.	J-673-401-08
								SHEET NO.	23 OF 23

A
B
C
D

415V MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM (SINGLE FRONT, DRAWOUT TYPE)

DESCRIPTION

UEL. DRG. NO.

REVISION

GENERAL NOTES

	पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
	POWER GRID CORPORATION OF INDIA LTD.
± 800KV, 6000MW HVDC Multi Terminal NER/ER-NR/WR Interconnector I	
Approved in Category :	☒ I ☒ II ☒ III ☒ IV
Check by :	
Signature :	
Date :	04/05/17

GENERAL ARRANGEMENT DIAGRAM.

J-673-100-01

R2

GENERAL ARRANGEMENT DIAGRAM

J-673-101-01

R5

SINGLE LINE DIAGRAM

J-673-101-02

R5

BILL OF MATERIAL

J-673-201-01

R3

SCHEMATIC DIAGRAM

J-673-301-01

R4

SCHEMATIC DIAGRAM

J-673-401-01 TO 07

R2

J-673-401-08

R3

BOARD NAME PLATE DETAIL

SR.	BOARD NAME PLATE	QTY	REF. DRG.
1.	S3.P1.U.E.MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM	01 NO	J-673-101-01
2.	S3.P2.U.E.MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM	01 NO	J-673-101-02
3.	S3.P3.U.E.MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM	01 NO	
4.	S3.P4.U.E.MCC (MOTOR CONTROL CENTRE) FOR VALVE COOLING SYSTEM	01 NO	J-673-101-01

CUSTOMER:-



पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड

POWER GRID CORPORATION OF INDIA LIMITED.
(A Government of India Enterprise)

CONTRACTOR:-

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION

PROJECT:-

±800KV, 6000MW, HVDC MULTI-TERMINAL
NER/ER-NR/WR INTERCONNECTOR-I PROJECT

CA NO.:-

C-61901R-S056-8/CA-II/3660 DATED 22.12.2011
FOR ON-SHORE SUPPLIES & C-61901R-S056-8/CA-IV/3662
DATED 22.12.2011 FOR SERVICES

STATION:-

AGRA

MANUFACTURER:-

UNILEC

Unilec Engineers Ltd.
Begumpur Khatola Road,
Behrampur Industrial Area,
Gurgaon-122001

DRN.

NAME

SIGN

PRE.

S.S.GAUR

CHD.

D.KUMAR

APP.

K.C.BHATT

DESCRIPTION:-

COVERING SHEET

DATE

03.10.2013

JOB NO.:-

J-673

Rev. 01

DOCUMENT TITLE:- GA, SLD, BOM & SCHEME