

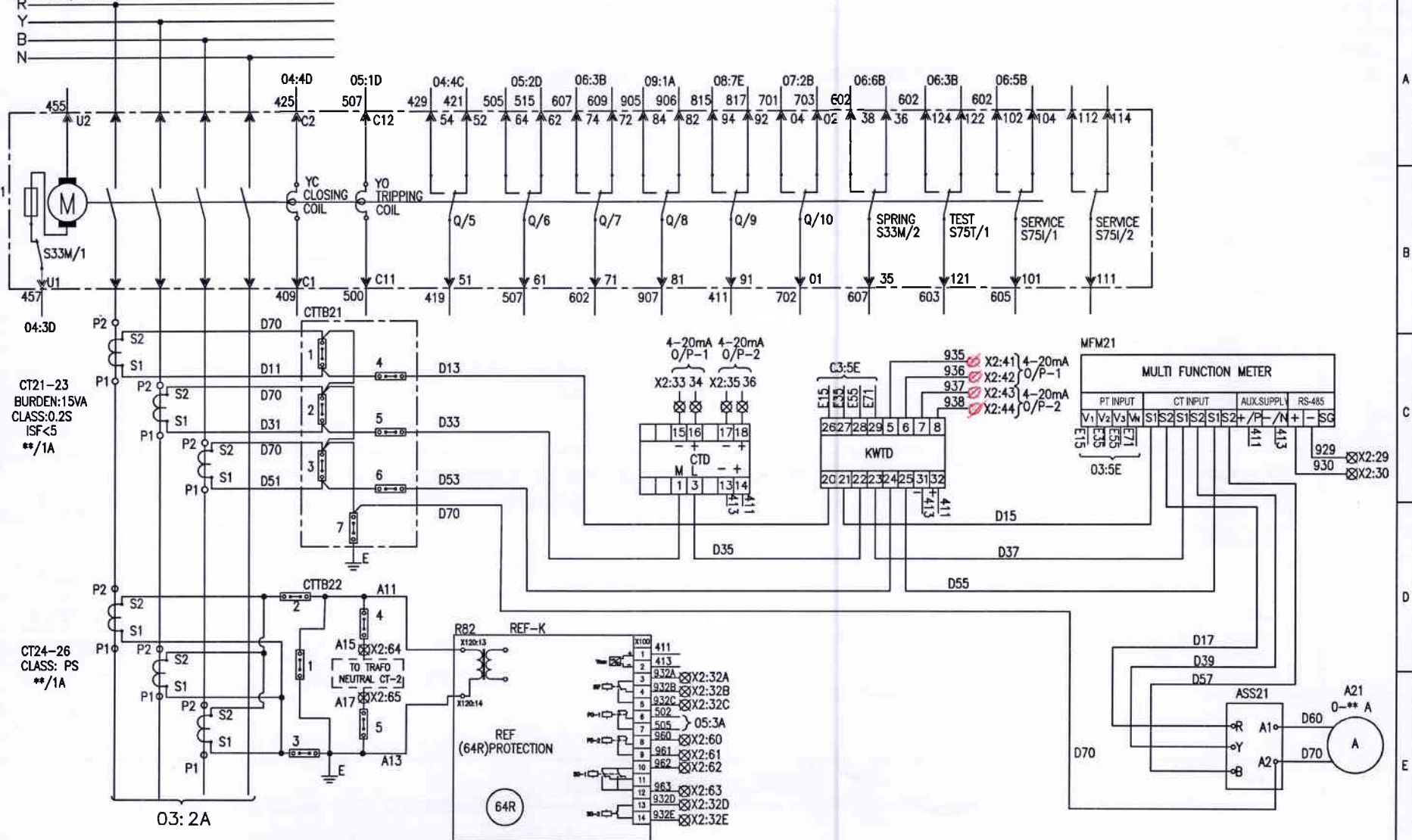
REFERENCE DRAWINGS:

1. CONTROL LOGIC (PE-DG-417-506-E004 R03)
2. ANALOG INPUT/OUTPUT LIST FOR ELECTRICAL SYSTEM (PE-DC-417-510-E151 REV 0)
3. BINARY INPUT/OUTPUT LIST FOR ELECTRICAL SYSTEM (PE-DC-417-510-E152 REV 0)
4. FRONT VIEW OF ELECTRICAL CONTROL PANEL (ECP) (PE-DG-417-510-E112 REV 4)
5. LOGIC DIAGRAM FOR CIRCUIT BREAKERS CONTROLLED FROM ELECTRICAL CONTROL PANEL AND ASSOCIATED DDCMIS (PE-DG-417-510-E153 REV 0)
6. LOGIC DIAGRAM FOR CIRCUIT BREAKERS CONTROLLED FROM DDCMIS ONLY (PE-DG-417-510-E154 REV 0)

DAET-1C

	CUSTOMER TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)				
	CONSULTANT TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA				
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M	DESIGN CHECKED APPROVED	TATA CONSULTING ENGINEERS LIMITED VENDOR DOCUMENT REVIEW STATUS ☐ A Drawing/Document approved as submitted. Proceed with fabrication/construction. ☒ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/ construction considering our comments. ☐ C Our comments are noted on this marked up print. ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. _____ Dated 23/10/2021 ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval. ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records. ☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted. ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor. ☐ I Drawing/Document returned without review. ☐ J Print not enclosed. Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of drawings, details, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.
03		NAME	DATE	SIGN	DRAWING NO. EP-108-012-001 <i>Harika</i> Date 23/10/2021 NO. OF SHEET. 13 REV. 02 TITLE: SCHEME FOR INCOMER-A CONTROLLED FROM ECP & DDCMIS
02	REVISED AS PER CUSTOMER COMMENTS				
01	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ	19.08.21		
REV HISTORY	DESCRIPTION			SCALE	

DRG NO. EP-4-CS-012-001



NOTE: THIS SCHEME IS APPLICABLE FOR Emax ACB

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		30.06.21
	2	20.09.21	REVISED AS PER CUSTOMER COMMENTS			DRAWN			
	1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21		DJ	CHECKED	DP		30.06.21
REV. NO.	DATE	DESCRIPTION		BY	APPD.	APPROVED	PSP		30.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

DRG. NO. EP-4-CS-012-001

NO. OF SHEETS	13
---------------	----

SHEET. NO.	02
---------------	----

REV.
02

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-001

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	SCALE	DATE
4								
3								
2	20.09.21	REVISED AS PER CUSTOMER COMMENTS			DESIGNED	DJ		30.06.21
1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21			DRAWN			
					CHECKED	DP		30.06.21
					APPROVED	PSP		30.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

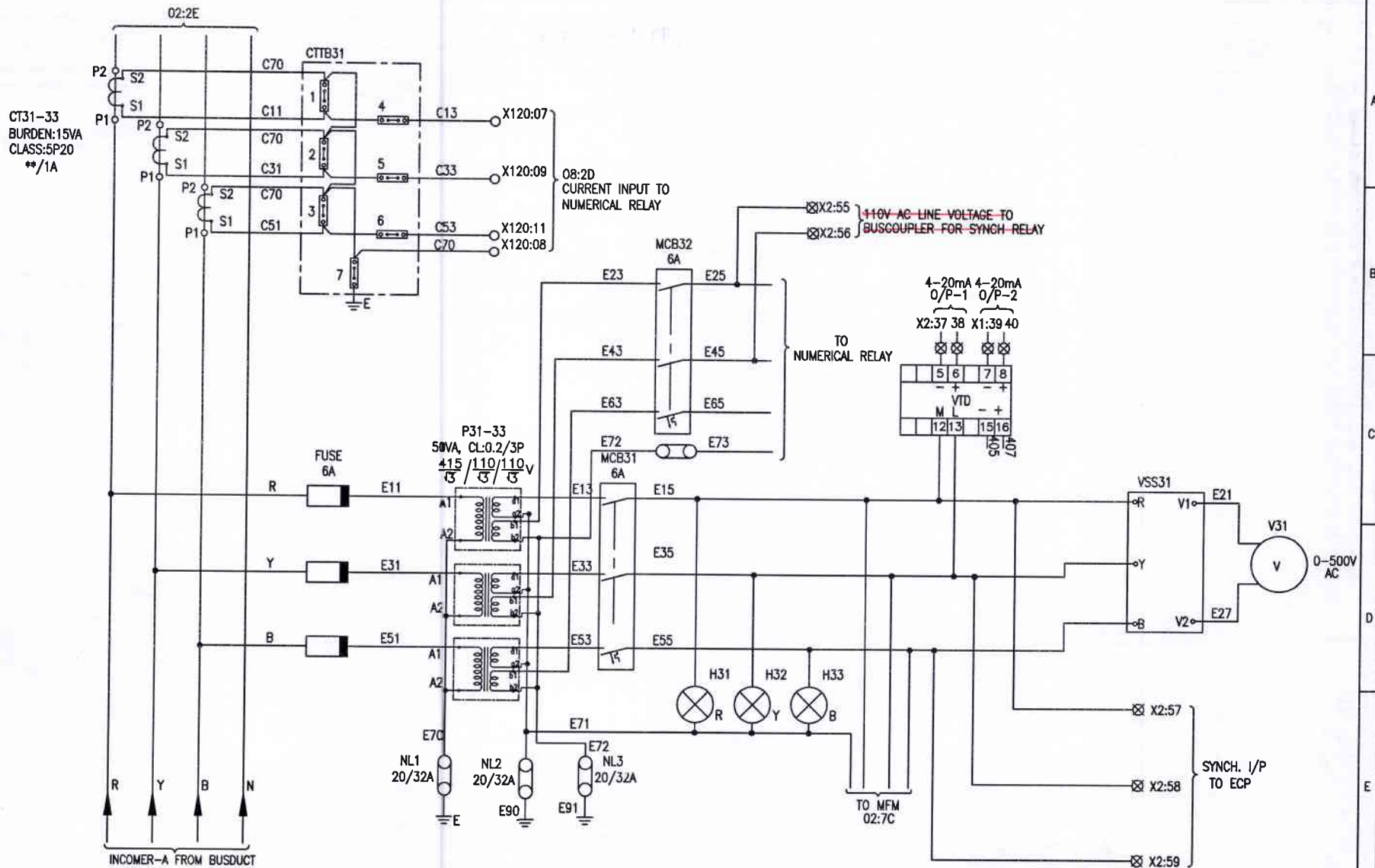
DRG. NO. EP-4-CS-012-001



NO. OF SHEETS 13

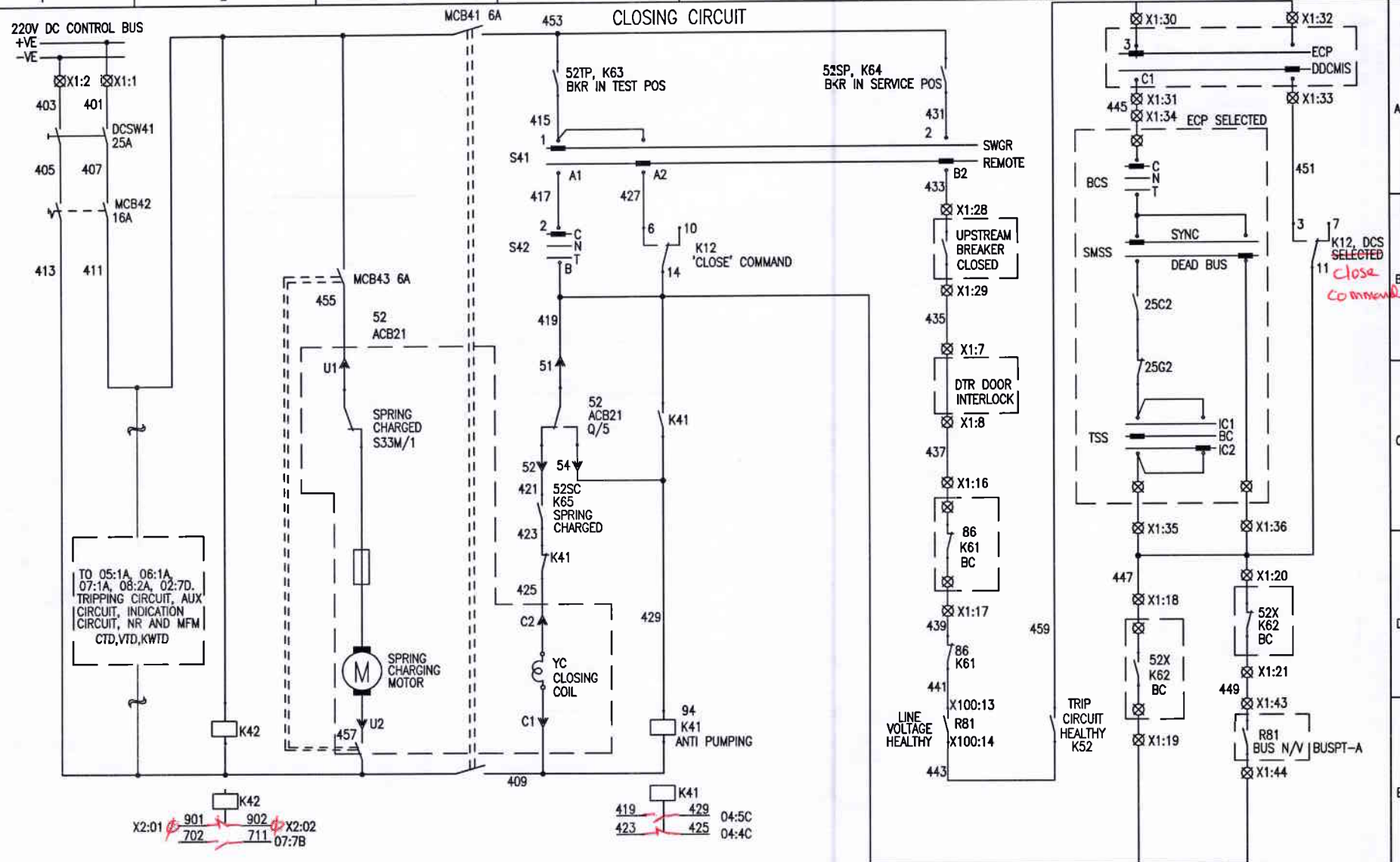
SHEET NO. 03

REV. 02



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		30.06.21
	2	20.09.21	REVISED AS PER CUSTOMER COMMENTS			DRAWN			
	1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ		CHECKED	DP		30.06.21
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		30.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

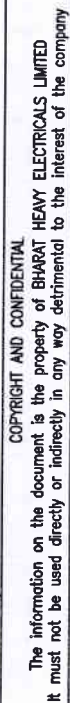
DRG. NO. EP-4-CS-012-001



NO. OF SHEETS	13
SHEET. NO.	04

REV.	02
------	----

ALL DIMENSIONS ARE IN MM.



DRG. NO. EP-4-CS-012-001

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		30.06.21
	2	20.09.21	REVISED AS PER CUSTOMER COMMENTS			DRAWN			
	1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21		DJ	CHECKED	DP		30.06.21
	REV. NO.	DATE	DESCRIPTION	By	APPD.	APPROVED	PSP		30.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMIS

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-001

NO. OF SHEETS	13
---------------	----

SHEET. NO.	05
---------------	----

REV.
02

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

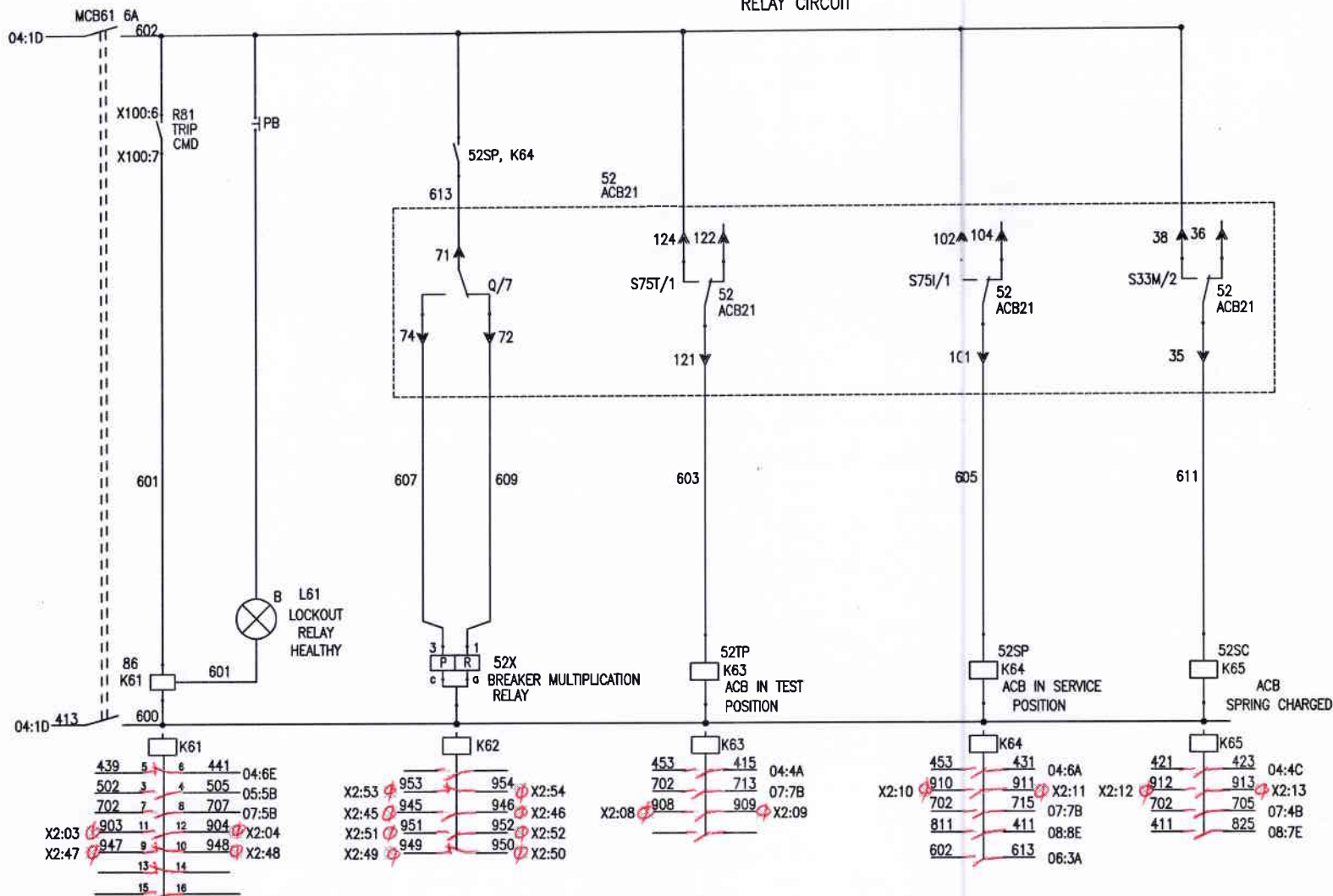
DRG. NO. EP-4-CS-012-001

INVENTORY NO.

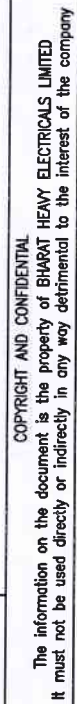
NOTE: Limit switches are shown in isolated position.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	DATE
4							
3					DESIGNED	DJ	30.06.21
2	20.09.21	REVISED AS PER CUSTOMER COMMENTS			DRAWN		
1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ		CHECKED	DP	30.06.21

RELAY CIRCUIT



ALL DIMENSIONS ARE IN MM.



DRG. NO. EP-4-CS-012-001

INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE			
	3					DESIGNED	DJ		30.06.21		TITLE : POWER & CONTROL SCHEME INCOMER-A CONTROLLED FROM ECP & DDCMIS	NO. OF SHEETS	13	
	2	20.09.21	REVISED AS PER CUSTOMER COMMENTS				DRAWN					SHEET. NO.	07	
	1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21				DJ	CHECKED	DP				30.06.21	
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP				30.06.21	

DRG. NO. EP-4-CS-012-001

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4									
3							DESIGNED	DJ	30.06.21
2	20.09.21	REVISED AS PER CUSTOMER COMMENTS					DRAWN		
1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ				CHECKED	DP	30.06.21
									30.06.21



SCALE: NA

BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

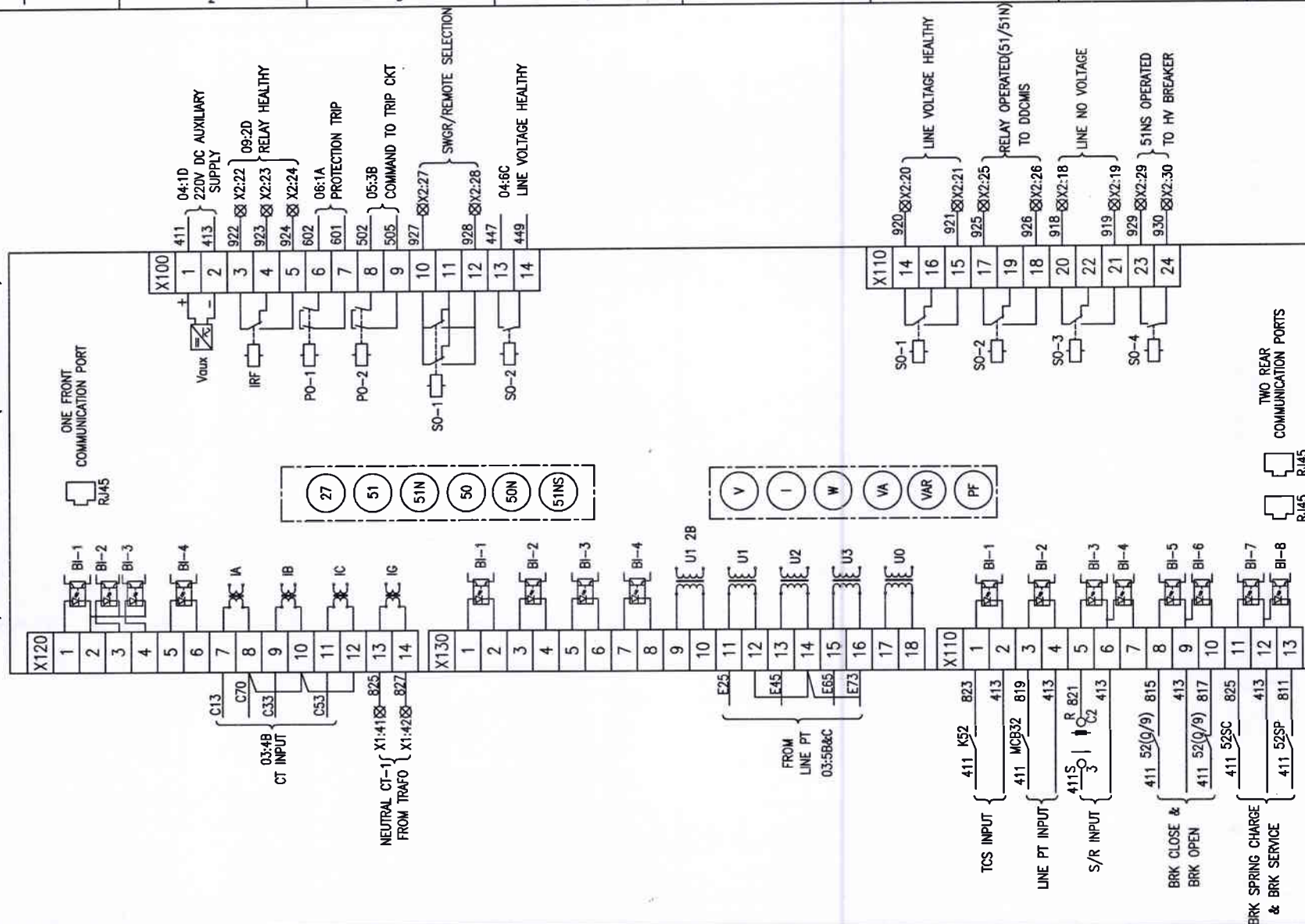
POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

DRG. NO. EP-4-CS-012-001

NO. OF SHEETS	13
SHEET. NO.	08
REV.	02

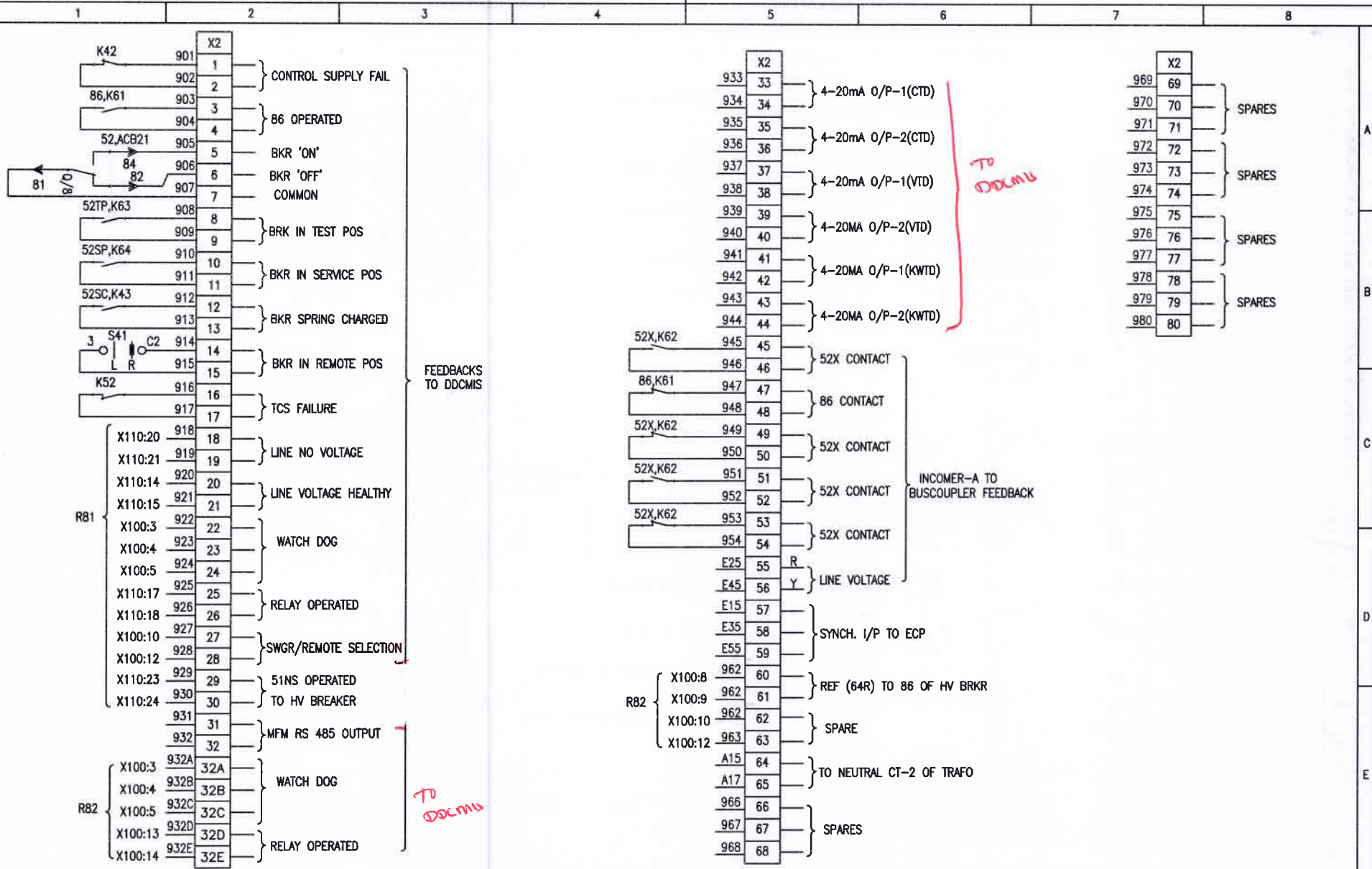
R81, NUMERICAL RELAY TYPE: REF615 (HBFHAEAGND1ANN11G)



DRG. NO. EP-4-CS-012-001

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-001	REV. 02
4													
3							DESIGNED	DJ	30.06.21				
2	20.09.21		REVISED AS PER CUSTOMER COMMENTS				DRAWN						
1	19.08.21		REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ			CHECKED	DP	30.06.21				



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMIS

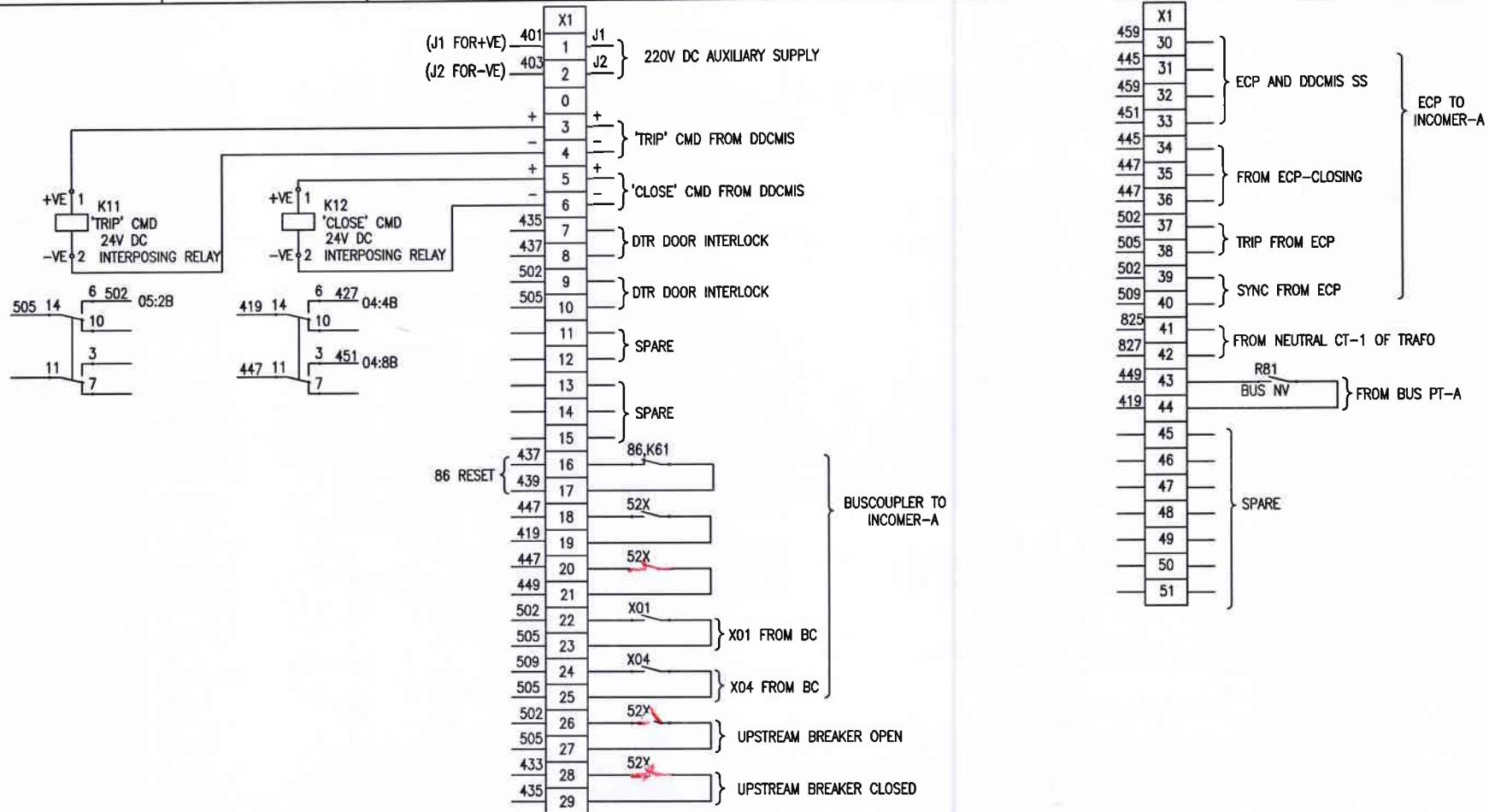
NO. OF SHEETS	13
SHEET NO.	09

COPYRIGHT AND CONFIDENTIAL
 The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
 It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-001

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	REV.
4														
3						DESIGNED	DJ			30.06.21				
2	20.09.21		REVISED AS PER CUSTOMER COMMENTS			DRAWN								
1	19.08.21		REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ		CHECKED	DP			30.06.21				
										30.06.21				



BHARAT HEAVY ELECTRICALS LIMITED
 SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
 INCOMER-A CONTROLLED FROM ECP & DDCMIS



NO. OF SHEETS 13
 SHEET NO. 10

JOB NO. CP-012
 DRG. NO. EP-4-CS-012-001
 REV. 02

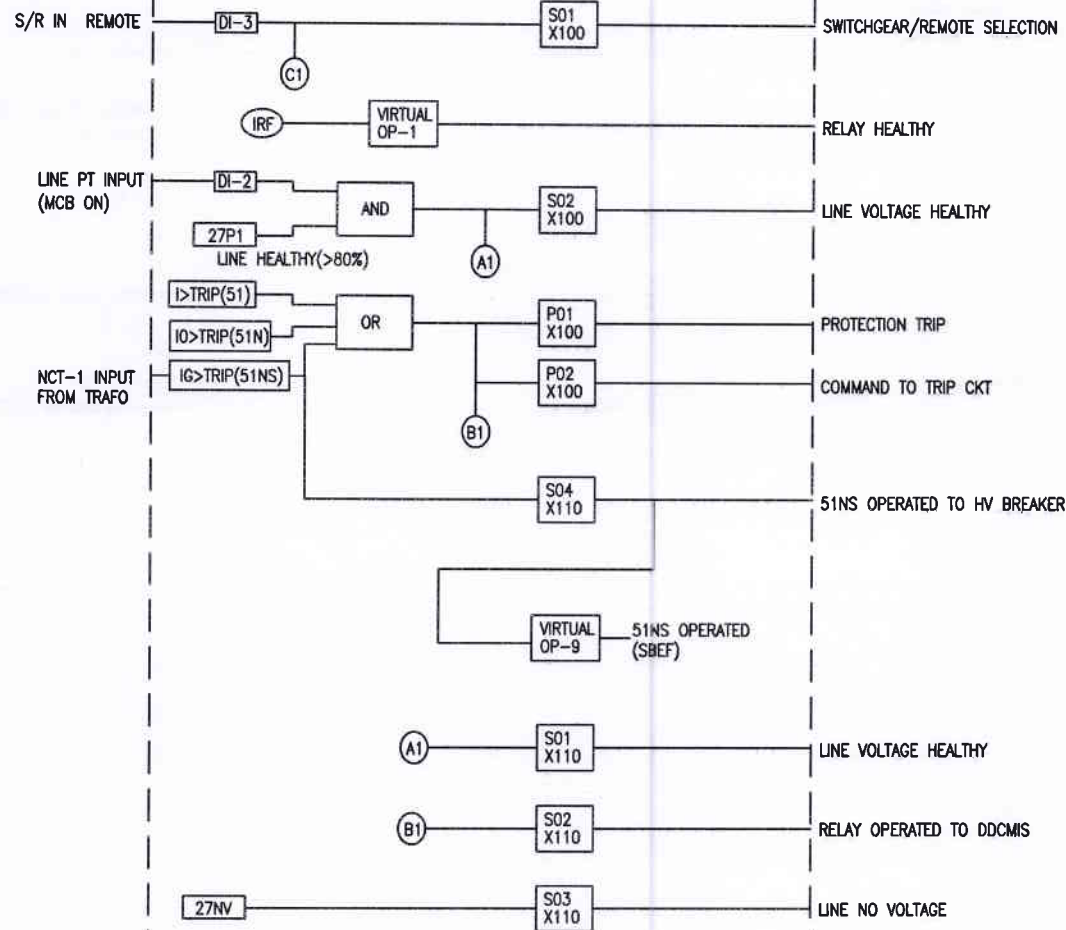
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

INPUT TO NUMERICAL RELAY
(HARD WIRED)

R81

OUTPUT OF NUMERICAL RELAY
(HARD WIRED)



PROTECTION FUNCTIONS	
51	3-PH TIME DELAYED OVER CURRENT PROTECTION
51N	INVERSE TIME EARTH FAULT PROTECTION
27	UNDER VOLTAGE & NO VOLTAGE PROTECTION
51NS	S/B EARTH FAULT
FAULT RECORDING	
E	EVENT RECORDING
F	FAULT RECORDING
DR	DISTURBANCE RECORDING
CONDITION MONITORING FEATURES	
IRF	RELAY SELF SUPERVISION
VTS	VOLTAGE TRANSFORMER SUPERVISION
CTS	CURRENT TRANSFORMER SUPERVISION
LED INDICATION ON RELAY FRONT	
1	PHASE-R
2	PHASE-Y
3	PHASE-B
4	NEUTRAL/GROUND
5	TIME
6	INSTANTANEOUS
7	50/51
8	50/51N
9	51NS (SBEP)
10	LINE UNDER VOLTAGE

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	SCALE	DATE
4								
3					DESIGNED	DJ		30.06.21
2	20.09.21	REVISED AS PER CUSTOMER COMMENTS			DRAWN			
1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21			CHECKED	DP		30.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMS



NO. OF SHEETS	13
SHEET. NO.	11
REV.	02

JOB NO. CP-012

DRG. NO. EP-4-CS-012-001

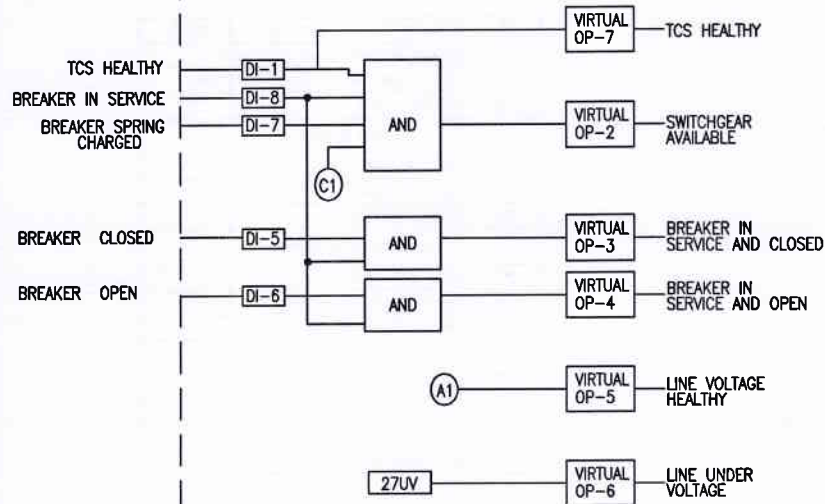
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

INPUT TO NUMERICAL RELAY
(HARD WIRED)

R81

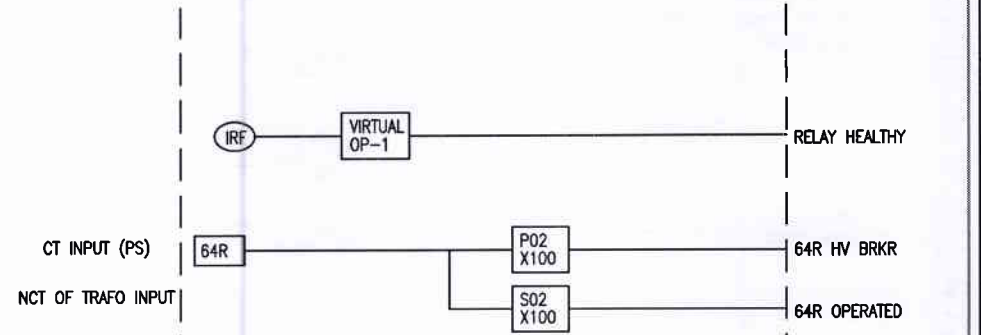
OUTPUT OF NUMERICAL RELAY
(HARD WIRED)



INPUT TO NUMERICAL RELAY
(HARD WIRED)

R82

OUTPUT OF NUMERICAL RELAY
(HARD WIRED)

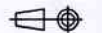


INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4										
3						DESIGNED	DJ			30.06.21
2	20.09.21		REVISED AS PER CUSTOMER COMMENTS			DRAWN				
1	19.08.21		REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ		CHECKED	DP			30.06.21
										30.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
INCOMER-A CONTROLLED FROM ECP & DDCMIS



NO. OF SHEETS	13
SHEET NO.	12
REV.	02

JOB NO. CP-012

DRG. NO. EP-4-CS-012-001

SCALE: NA

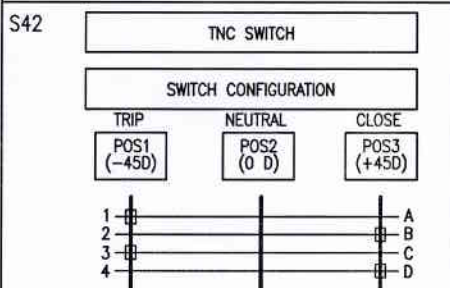
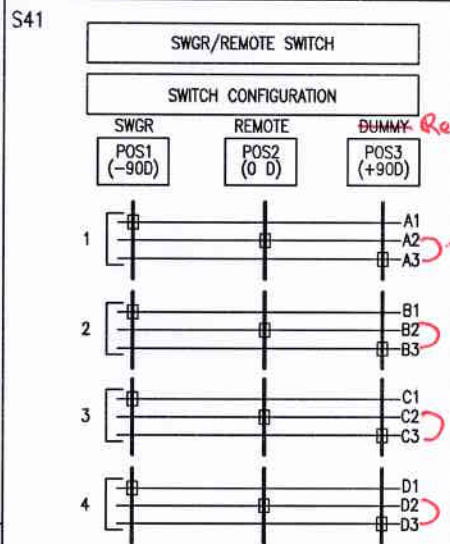
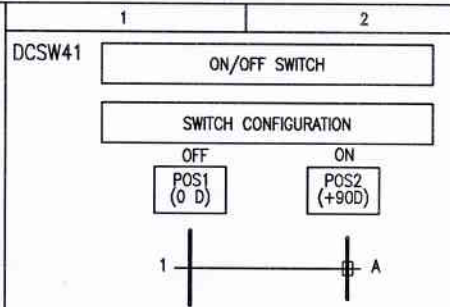
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-001

INVENTORY NO.



BILL OF MATERIAL FOR EP-4-CS-012-001

SL NO.	DESCRIPTION	MAKE	QTY
1	****A ACB 4P EDO 50KA WITHOUT RELEASE	ABB	1
2	NUMERICAL RELAY FOR REF PROTECTION (REF615-K CONFIGURATION)(HBFK)	ABB	1
3	NUMERICAL RELAY FOR INCOMER -(REF615-H CONFIGURATION)(HBFH)	ABB	1
4	BREAKER MULTIPLICATION RELAY	ABB	1
5	LOCK OUT RELAY	ABB	1
6	TCS RELAY - VAX	GE	1
7	CT ****/1A CL-0.2S 15VA	CUSTOMER APPROVED	3
8	CT ****/1A CL-5P2D 15VA	CUSTOMER APPROVED	3
9	CT ****/1A CL-PS	CUSTOMER APPROVED	3
10	PT 1-PH 415/RT(3) / 110/RT(3) / 110/RT(3) CL-0.2/3P	CUSTOMER APPROVED	3
11	MULTI FUNCTION METER	SECURE	1
12	KILOWATT TRANSDUCER	SECURE	1
13	CURRENT TRANSDUCER	SECURE	1
14	VOLTAGE TRANSDUCER	SECURE	1
15	AMMETER 0-****A	RISHABH	1
16	VOLTMETER 0-500V	RISHABH	1
17	AMMETER SELECTOR SWITCH(C10P439AM)	RECOM	1
18	VOLTMETER SELECTOR SWITCH(C10P339VM)	RECOM	1
19	ON OFF SWITCH 25A 220V DC(SPD3125BB2/TB3)	RECOM	1
20	TNC SWITCH 25A 220V DC LOCKABLE(BC251P244BB1/L)	RECOM	1
21	SWGR/REMOTE SWITCH 25A 220V DC LOCKABLE(SPD13416BB3/LM/TA3/L)	RECOM	1
22	FUSE BASE 32A WITH FUSE 6A AC	L&T	3
23	3P MCB 6A	EATON	2
24	DP MCB 6A	EATON	5
25	DP MCB 16A	EATON	1
26	INTERPOSING RELAY - RE302	JYOTI	2
27	4NO AUX CONTACTOR 220V DC	C&S ELECTRIC	3
28	2NO+2NC AUX CONTACTOR 220V DC	C&S ELECTRIC	2
29	INDICATING LAMP RED 63.5V AC	C&S ELECTRIC/ L&T (ESBEE)	1
30	INDICATING LAMP YELLOW 63.5V AC	C&S ELECTRIC/ L&T (ESBEE)	1
31	INDICATING LAMP BLUE 63.5V AC	C&S ELECTRIC/ L&T (ESBEE)	1
32	INDICATING LAMP RED 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
33	INDICATING LAMP GREEN 220V DC	C&S ELECTRIC/ L&T (ESBEE)	1
34	INDICATING LAMP BLUE 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
35	INDICATING LAMP AMBER 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
36	INDICATING LAMP WHITE 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
37	PUSH BUTTON	C&S ELECTRIC/ L&T	1
38	CTTB 10 SQ.MM		21
39	NEUTRAL LINK 32A		3
40	TERMINAL BLOCK 4SQ.MM		131

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	SCALE: NA
4							
3					DESIGNED	DJ	30.06.21
2	20.09.21	REVISED AS PER CUSTOMER COMMENTS			DRAWN		
1	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.947 DTD. 06.08.21	DJ		CHECKED	DP	30.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME
INCOMER-A CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

DRG. NO. EP-4-CS-012-001

NO. OF SHEETS

13

SHEET NO.

13

REV. 02

REFERENCE DRAWINGS:

1. CONTROL LOGIC (PE-DG-417-506-E004 R03)
2. ANALOG INPUT/OUTPUT LIST FOR ELECTRICAL SYSTEM (PE-DC-417-510-E151 REV 0)
3. BINARY INPUT/OUTPUT LIST FOR ELECTRICAL SYSTEM (PE-DC-417-510-E152 REV 0)
4. FRONT VIEW OF ELECTRICAL CONTROL PANEL (ECP) (PE-DG-417-510-E112 REV 4)
5. LOGIC DIAGRAM FOR CIRCUIT BREAKERS CONTROLLED FROM ELECTRICAL CONTROL PANEL AND ASSOCIATED DDCMIS (PE-DG-417-510-E153 REV 0)
6. LOGIC DIAGRAM FOR CIRCUIT BREAKERS CONTROLLED FROM DDCMIS ONLY (PE-DG-417-510-E154 REV 0)

DAET-BC

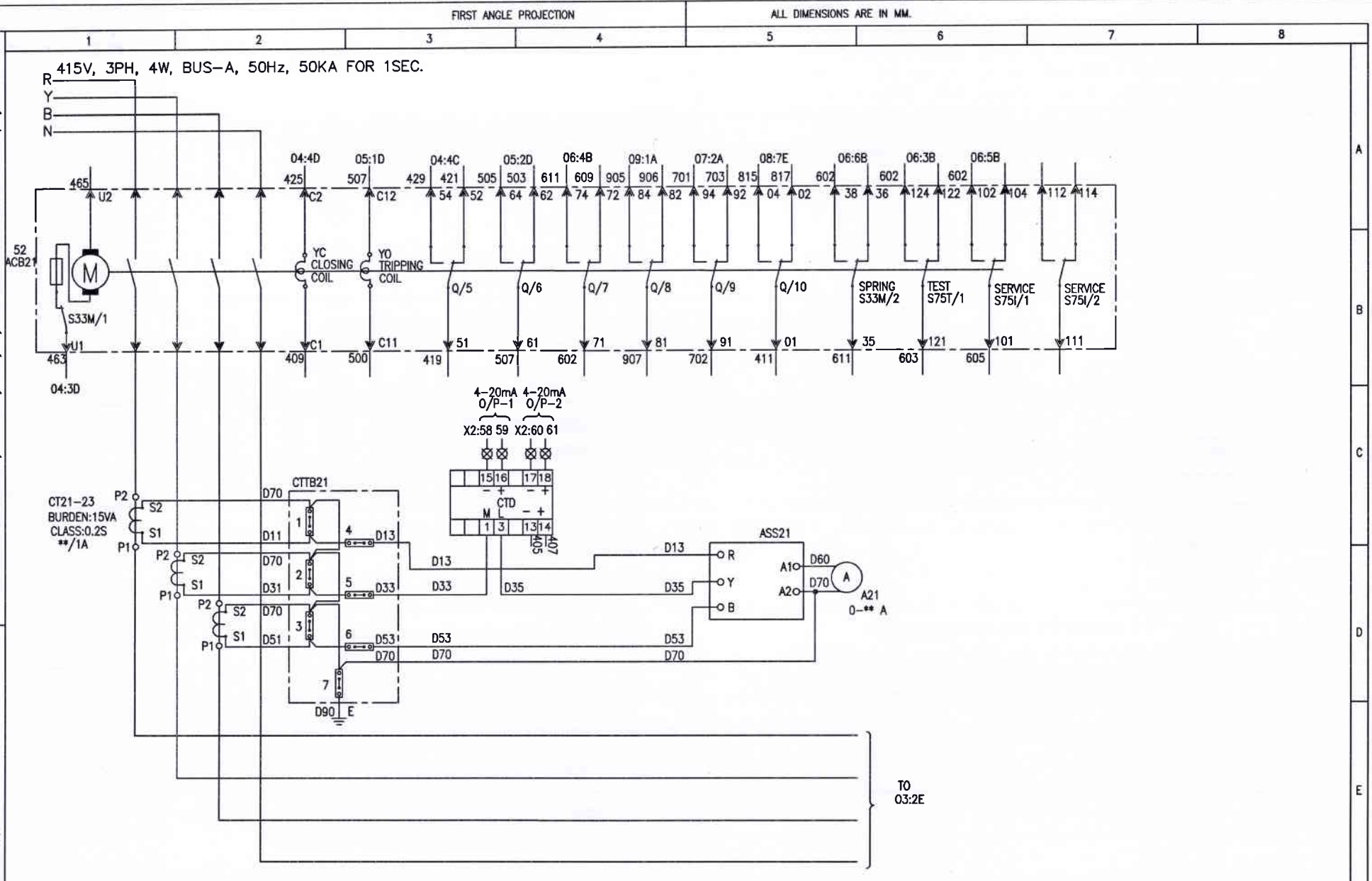
	CUSTOMER TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)				
	CONSULTANT TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA				
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M	NAME DESIGN CHECKED APPROVED	DATE DJ DP PSP
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-003 NO. OF SHEET.14 REV. 01
02					
01	REVISED AS PER CUSTOMER COMMENTS	DJ	20.09.21		
REV HISTORY	DESCRIPTION			SCALE	TITLE:SCHEME FOR BUSCOUPLER CONTROLLED FROM ECP & DDCMIS

**TATA CONSULTING ENGINEERS LIMITED
VENDOR DOCUMENT REVIEW STATUS**

- ☐ A Drawing/Document approved as submitted. Proceed with fabrication/construction.
- ☒ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/ construction considering our comments.
- ☐ C Our comments are noted on this marked up print.
- ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. _____ Dated. 23/10/2021
- ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval.
- ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records.
- ☐ G Drawings/ Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted. 01/07/21
- ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor. 01/07/21
- ☐ I Drawing/Document returned without review.
- ☐ J Print not enclosed. 01/07/21
- Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.

Reviewed by: *Harika* Date: 23/10/2021

DRG. NO. EP-4-CS-012-003



INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3				DESIGNED	DJ			01.07.21		TITLE : POWER & CONTROL SCHEME BUSCOUPLER CONTROLLED FROM ECP & DDCMIS	NO. OF SHEETS	14		
	2				DRAWN							SHEET. NO.	02		
	1	20.09.21	REVISED AS PER CUSTOMER COMMENTS	DJ	CHECKED	DP		01.07.21							
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		01.07.21		SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-003	REV. 01	

COPYRIGHT AND CONFIDENTIAL
 The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
 It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-003

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4									
3							DESIGNED	DJ	01.07.21
2							DRAWN		
1	20.09.21	REVISED AS PER CUSTOMER COMMENTS	DJ				CHECKED	DP	01.07.21
									01.07.21



BHARAT HEAVY ELECTRICALS LIMITED
 SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
 BUSCOUPLER CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

DRG. NO. EP-4-CS-012-003

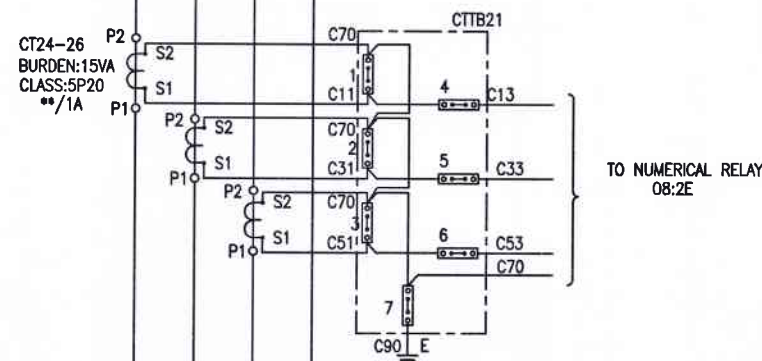
NO. OF SHEETS 14
 SHEET NO. 03
 REV. 01

FIRST ANGLE PROJECTION

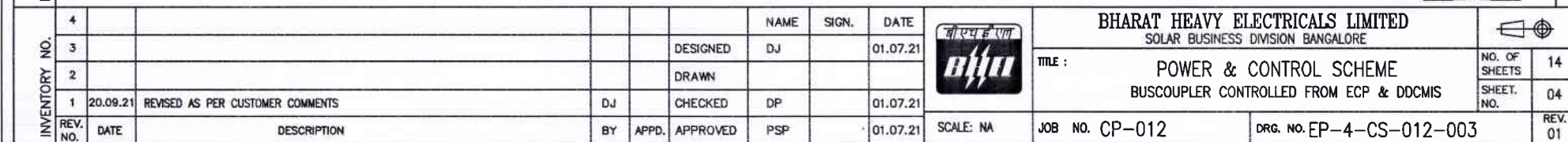
ALL DIMENSIONS ARE IN MM.

FROM 02:6E

415V, 3PH, 4W, BUS-B, 50Hz, 50KA FOR 1SEC.



COPYRIGHT AND CONFIDENTIAL

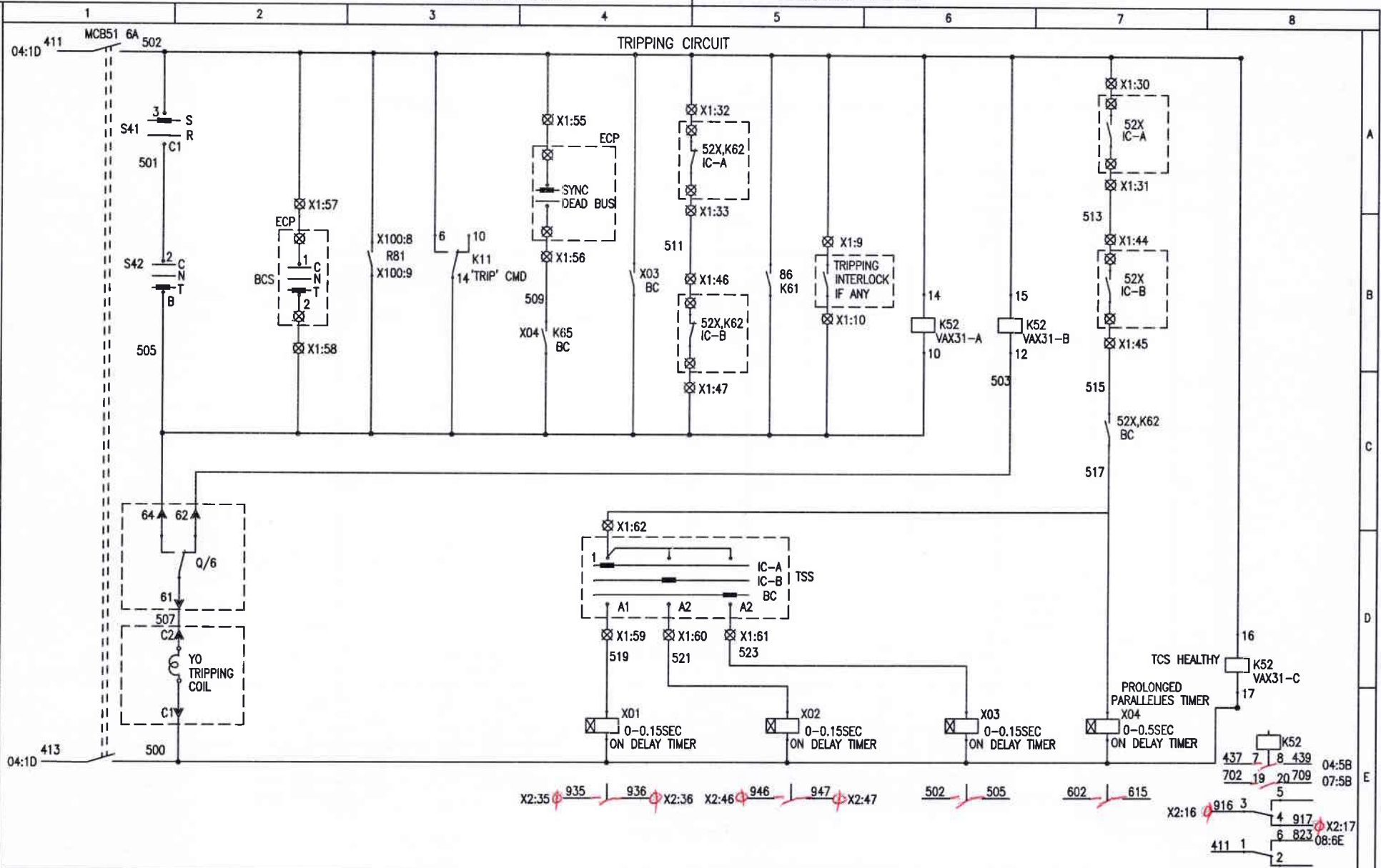


COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-003

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	REV.
4														
3								DESIGNED	DJ	01.07.21				
2								DRAWN						
1	20.09.21		REVISED AS PER CUSTOMER COMMENTS	DJ				CHECKED	DP	01.07.21				

BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
BUSCOUPLER CONTROLLED FROM ECP & DDCMS



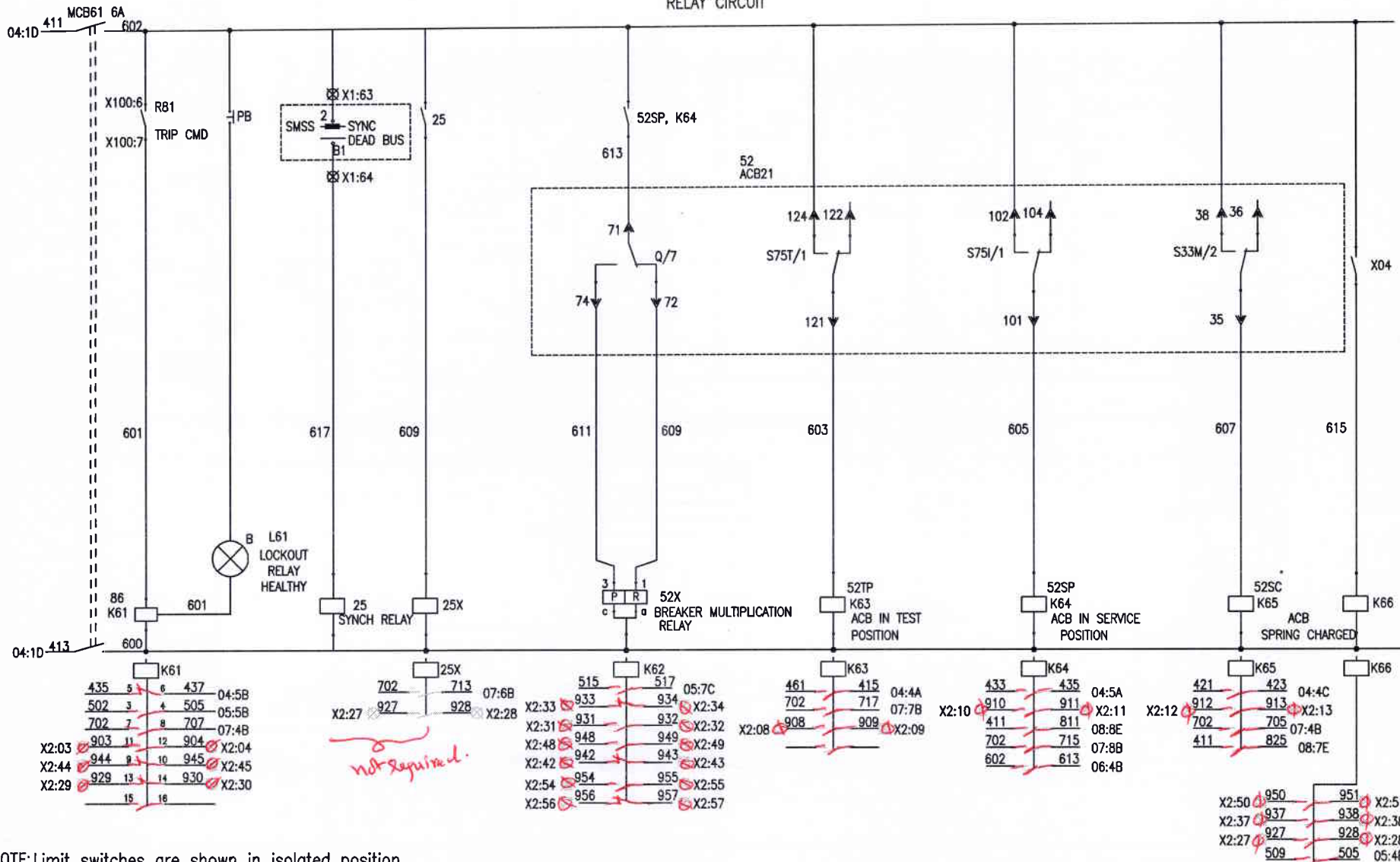
NO. OF SHEETS : 14
SHEET NO. : 05

SCALE : NA

JOB NO. CP-012

REV. 01

ALL DIMENSIONS ARE IN MM.



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

NO. OF SHEETS	14
SHEET. NO.	06

DRG. NO. EP-4-CS-012-003

REV.	01
------	----

INVENTORY NO.	4					NAME	SIGN.	DATE
	3				DESIGNED	DJ		01.07.21
	2				DRAWN			
	1	20.09.21	REVISED AS PER CUSTOMER COMMENTS	DJ	CHECKED	DP		01.07.21
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	01.07.21



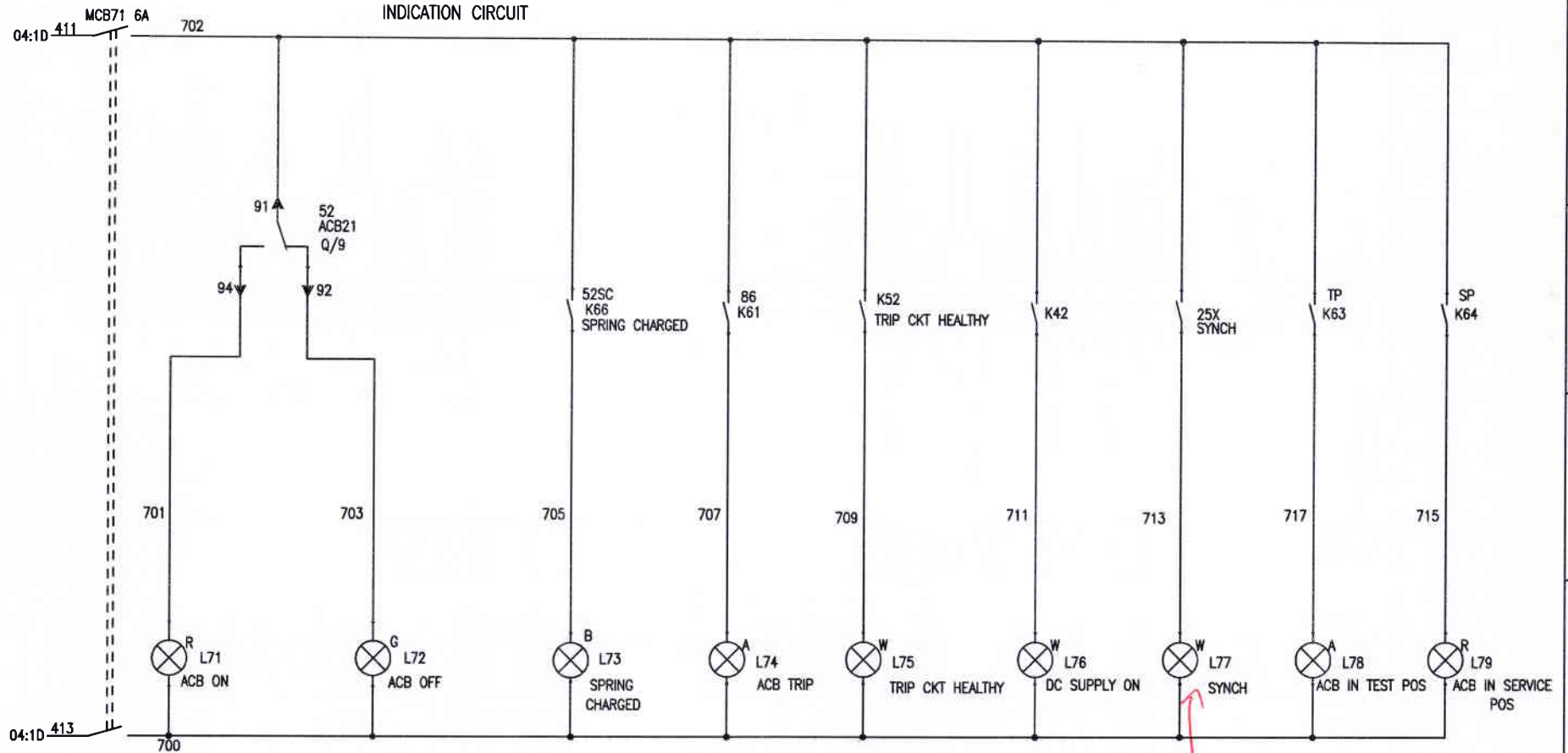
SCALE: NA

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-003

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

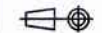


INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4										
3								DESIGNED	DJ	01.07.21
2								DRAWN		
1	20.09.21		REVISED AS PER CUSTOMER COMMENTS	DJ				CHECKED	DP	01.07.21
										01.07.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
BUSCOUPLER CONTROLLED FROM ECP & DDCMIS



NO. OF SHEETS 14
SHEET. NO. 07

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-003

REV. 01

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		01.07.21
	2					DRAWN			
	1	20.09.21	REVISED AS PER CUSTOMER COMMENTS		DJ		CHECKED	DP	01.07.21
	REV. NO.	DATE	DESCRIPTION		BY	APPD.	APPROVED	PSP	01.07.21



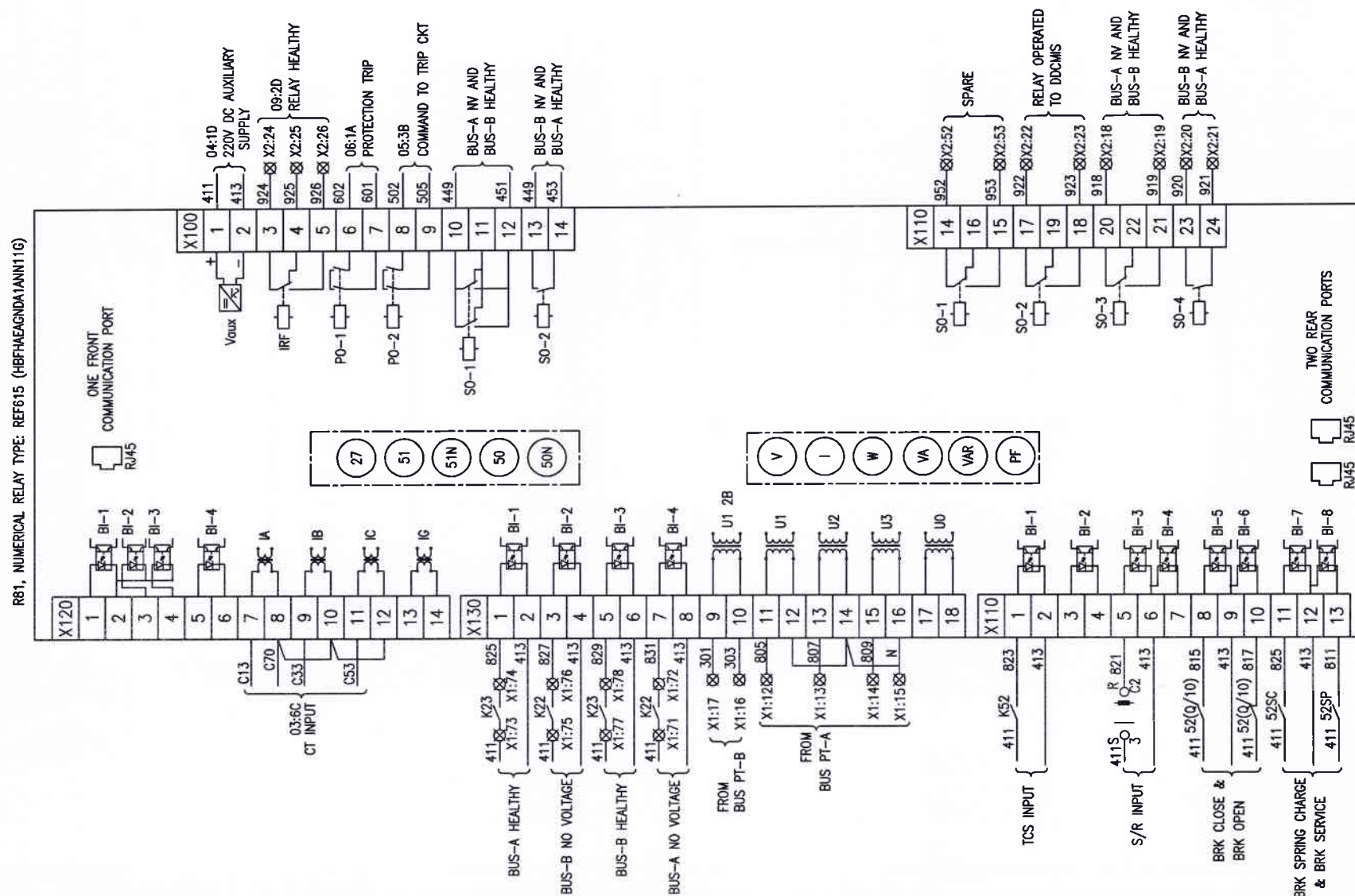
BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
BUSCOUPLER CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

DRG. NO. EP-4-CS-012-003

NO. OF SHEETS	14
SHEET. NO.	08
3	REV. 01

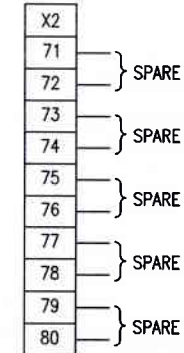
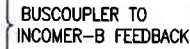
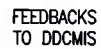


FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

A
B
C
D
E

DRG. NO. EP-4-CS-012-003



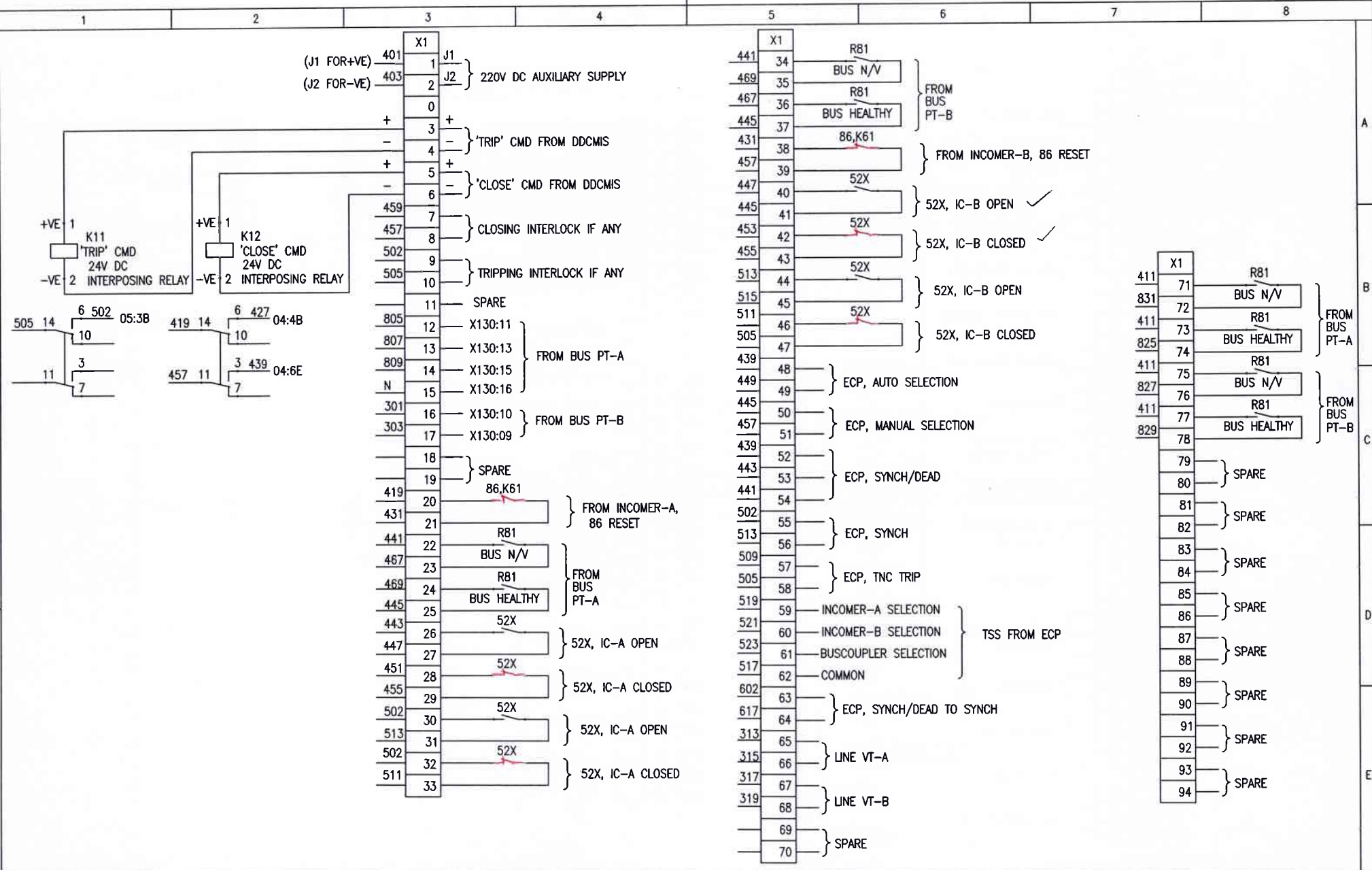
INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ		01.07.21		TITLE : POWER & CONTROL SCHEME BUSCOUPLER CONTROLLED FROM ECP & DDCMIS	NO. OF SHEETS	14		
	2					DRAWN						SHEET. NO.	09		
	1	20.09.21	REVISED AS PER CUSTOMER COMMENTS		DJ	CHECKED	DP		01.07.21						
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP			01.07.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-003

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-003



INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-003	REV. 01
4														
3								DESIGNED	DJ	01.07.21				
2								DRAWN						
1	20.09.21		REVISED AS PER CUSTOMER COMMENTS	DJ				CHECKED	DP	01.07.21				
REV. NO.	DATE		DESCRIPTION	BY	APPD.	APPROVED	PSP			01.07.21				

BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
BUSCOUPLER CONTROLLED FROM ECP & DDCMIS

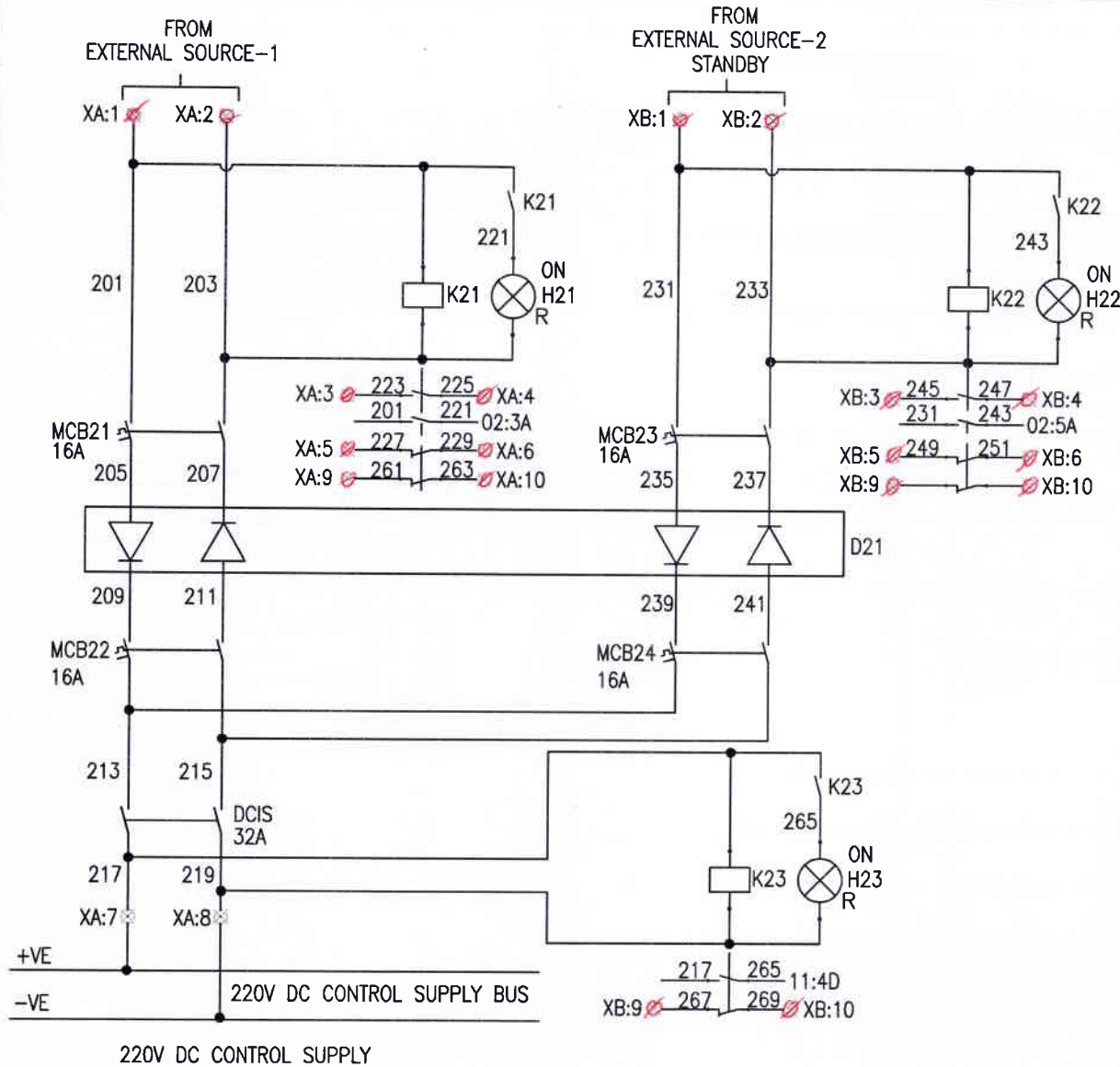
NO. OF SHEETS 14
SHEET. NO. 10

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

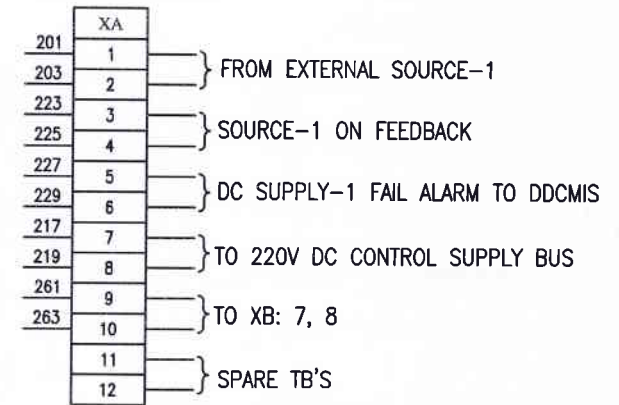
DRG. NO. EP-4-CS-012-003

FIRST ANGLE PROJECTION

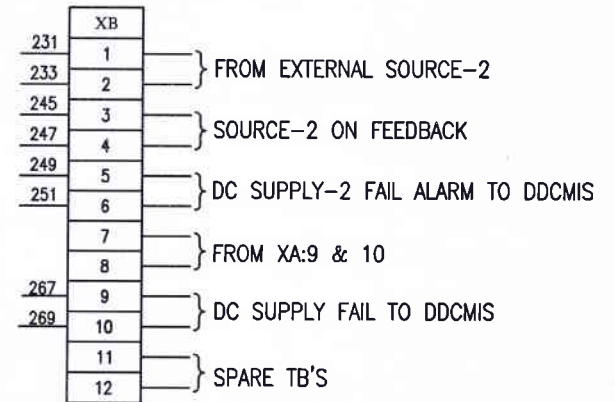
ALL DIMENSIONS ARE IN MM.



TERMINAL DIAGRAM



TERMINAL DIAGRAM



NOTE: TB-XA:1&2,XB:1&2 ARE SUITABLE FOR 35SQ.MM.

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	REV.
4														
3														
2														
1	20.09.21		REVISED AS PER CUSTOMER COMMENTS	DJ										

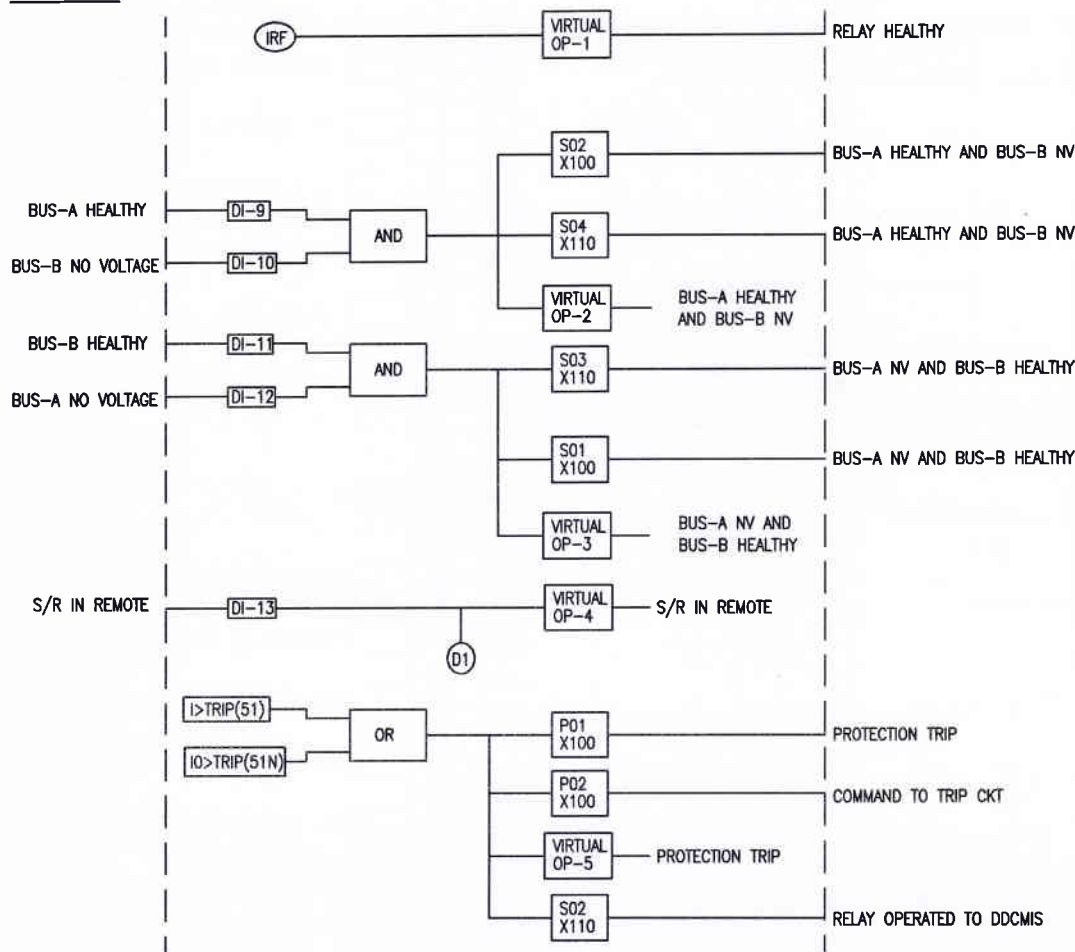
BHARAT HEAVY ELECTRICALS LIMITED		SOLAR BUSINESS DIVISION BANGALORE	
TITLE :		POWER & CONTROL SCHEME	
		BUSCOUPLER CONTROLLED FROM ECP & DDCMIS	
NO. OF SHEETS		14	
SHEET NO.		11	
REV.		01	

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

INPUT TO NUMERICAL RELAY
(HARD WIRED)

OUTPUT OF NUMERICAL RELAY
(HARD WIRED)



PROTECTION FUNCTIONS	
50/51	3-PH TIME DELAYED OVER CURRENT PROTECTION
50/51N	INVERSE TIME EARTH FAULT PROTECTION
27	UNDER VOLTAGE & NO VOLTAGE PROTECTION
FAULT RECORDING	
E	EVENT RECORDING
F	FAULT RECORDING
DR	DISTURBANCE RECORDING
CONDITION MONITORING FEATURES	
IRF	RELAY SELF SUPERVISION
VTS	VOLTAGE TRANSFORMER SUPERVISION
CTS	CURRENT TRANSFORMER SUPERVISION
LED INDICATION ON RELAY FRONT	
1	PHASE-R
2	PHASE-Y
3	PHASE-B
4	NEUTRAL/GROUND
5	TIME
6	INSTANTANEOUS
7	50/51
8	50/51N
9	BUS UNDER VOLTAGE

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE
4									
3						DESIGNED	DJ		01.07.21
2						DRAWN			
1	20.09.21		REVISED AS PER CUSTOMER COMMENTS	DJ		CHECKED	DP		01.07.21
							PSP		01.07.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
BUSCOUPLER CONTROLLED FROM ECP & DDCMIS

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-003



NO. OF SHEETS 14
SHEET NO. 12

REV. 01

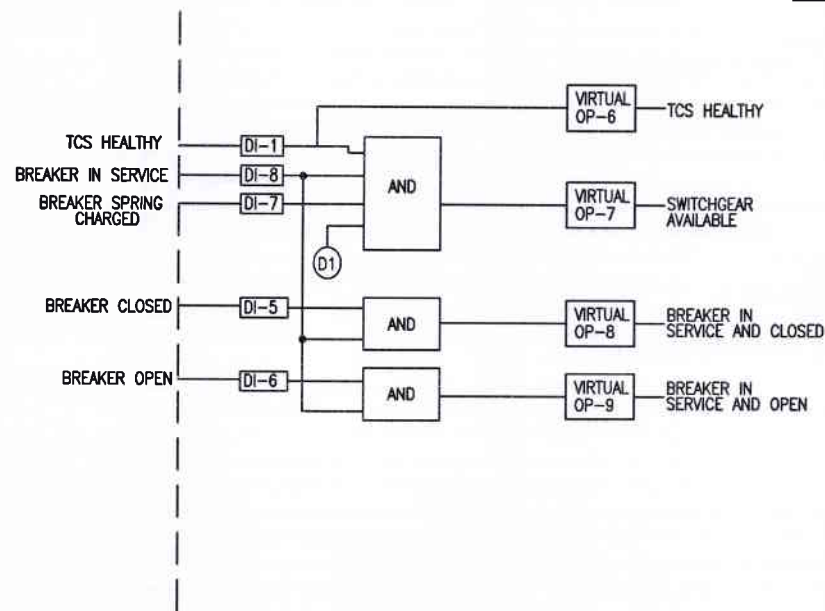
DRG. NO. EP-4-CS-012-003

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

INPUT TO NUMERICAL RELAY
(HARD WIRED)

OUTPUT OF NUMERICAL RELAY
(HARD WIRED)



INVENTORY NO.

4							NAME	SIGN.	DATE
3						DESIGNED	DJ		01.07.21
2						DRAWN			
1	20.09.21	REVISED AS PER CUSTOMER COMMENTS	DJ	CHECKED	DP				01.07.21
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP			01.07.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME
BUSCOUPLER CONTROLLED FROM ECP & DDCMIS

NO. OF SHEETS 14
SHEET. NO. 13

SCALE: NA

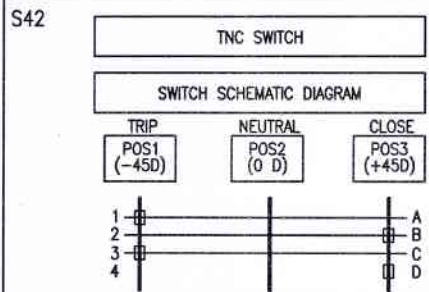
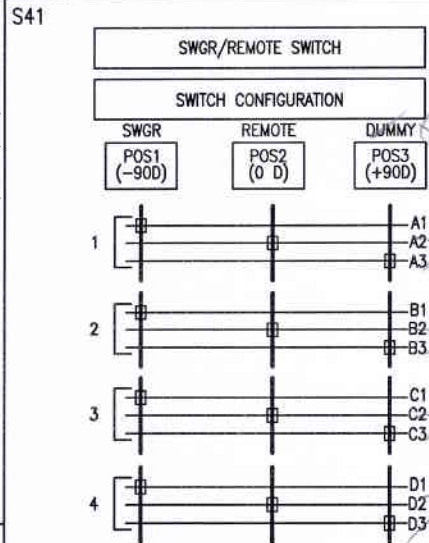
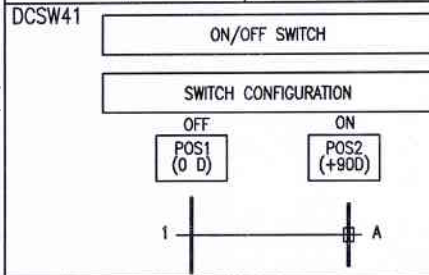
JOB NO. CP-012

DRG. NO. EP-4-CS-012-003

REV. 01

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



BILL OF MATERIAL FOR EP-4-CS-012-003			
SL. NO.	DESCRIPTION	MAKE	QTY
1	****A ACB 4P EDO 50KA WITHOUT RELEASE	ABB	1
2	NUMERICAL RELAY FOR BUSCOUPLER - (REF615-H CONFIGURATION)(HBFH)	ABB	1
3	BREAKER MULTIPLICATION RELAY	ABB	1
4	LOCK OUT RELAY	ABB	1
5	TCS RELAY - VAX	GE	1
6	CT ****/1A CL-0.2S 15VA	CUSTOMER APPROVED	3
7	CT ****/1A CL-5P20 15VA	CUSTOMER APPROVED	3
8	CURRENT TRANSDUCER	SECURE	1
9	AMMETER 0-****A	RISHABH	1
10	AMMETER SELECTOR SWITCH(C10P439AM)	RECOM	1
11	ON OFF SWITCH 25A 220V DC(SPD3125BB2/TB3)	RECOM	1
12	TNC SWITCH 25A 220V DC LOCKABLE(BC251P244BB1/L)	RECOM	1
13	SWGR/REMOTE SWITCH 25A 220V DC LOCKABLE(SPD13416BB3/LM/TA3/L)	RECOM	2
14	DP MCB 6A	EATON	5
15	DP MCB 16A	EATON	1
16	INTERPOSING RELAY - RE302	JYOTI	2
17	ON DELAY TIMER	L&T	5
18	SYNCH RELAY(SKE-11)	GE	1
19	4NO AUX CONTACTOR 220V DC	C&S ELECTRIC	5
20	2NO+2NC AUX CONTACTOR 220V DC	C&S ELECTRIC	4
21	INDICATING LAMP RED 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
22	INDICATING LAMP GREEN 220V DC	C&S ELECTRIC/ L&T (ESBEE)	1
23	INDICATING LAMP BLUE 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
24	INDICATING LAMP AMBER 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
25	INDICATING LAMP WHITE 220V DC	C&S ELECTRIC/ L&T (ESBEE)	2
26	PUSH BUTTON	C&S ELECTRIC/ L&T	1
27	CTTB 10 SQ.MM		14
28	TERMINAL BLOCK 4SQ.MM		168

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	DATE
4							
3					DESIGNED	DJ	01.07.21
2					DRAWN		
1	20.09.21	REVISED AS PER CUSTOMER COMMENTS	DJ		CHECKED	DP	01.07.21

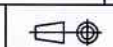


BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
BUSCOUPLER CONTROLLED FROM ECP & DDCMIS

JOB NO. CP-012

DRG. NO. EP-4-CS-012-003



NO. OF SHEETS 14
SHEET. NO. 14

REV. 01

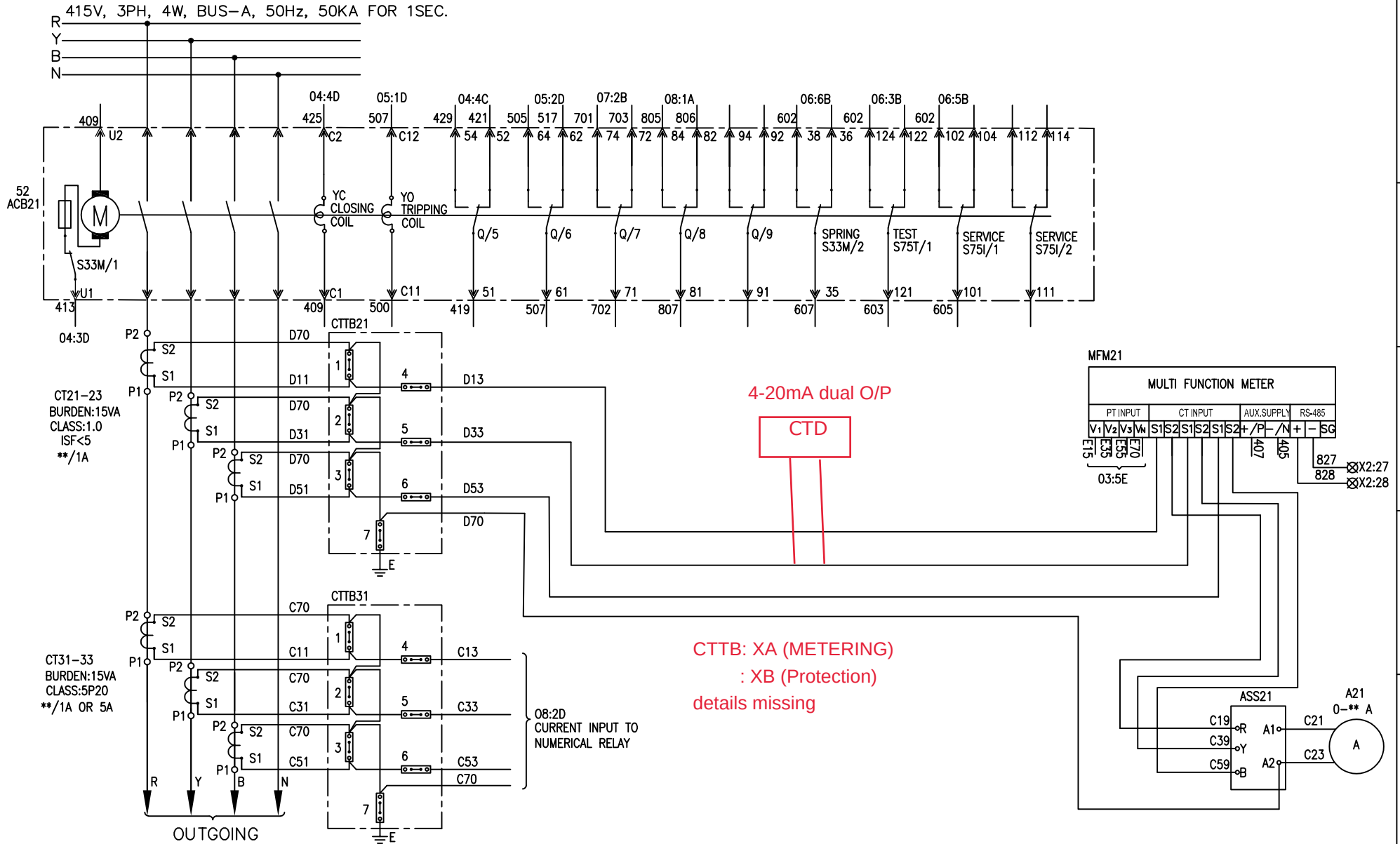
	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)					
	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA					
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.		DEPT. CODE M		NAME	SIGN	DATE
			DESIGN	DJ		28/07/21
			CHECKED	DP		28/07/21
			APPROVED	PSP		28/07/21
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-014	
02						
01					NO. OF SHEET.10	REV. 00
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)	

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-014
DRG. NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		28.07.2
	2					DRAWN			
	1					CHECKED	DP		28.07.2
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	28.07.2



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

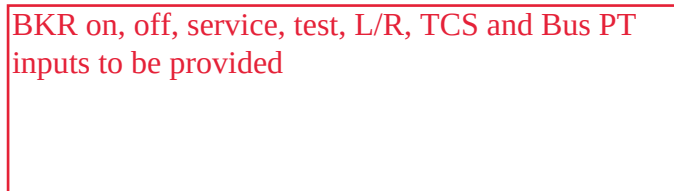
TITLE : POWER & CONTROL SCHEME
ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)

JOB NO. CP-012

DRG. NO. EP-4-CS-012-014



NO. OF SHEETS	10
SHEET. NO.	02
REV.	00



4						NAME	SIGN.	DATE
3					DESIGNED	DJ		28.07.2
2					DRAWN			
1					CHECKED	DP		28.07.2
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		28.07.2



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

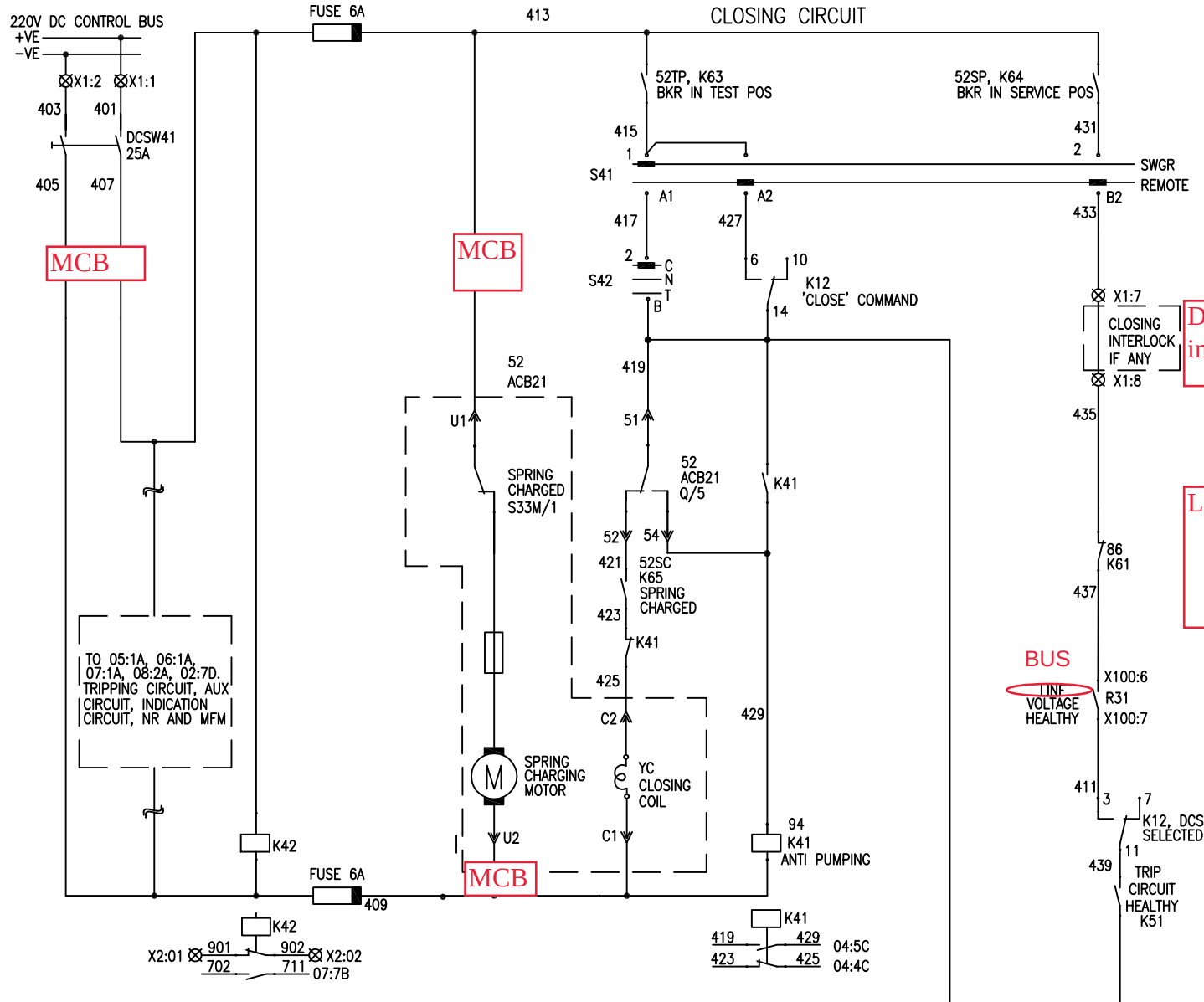
TITLE : POWER & CONTROL SCHEME
ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-014

		
NO. OF SHEETS	1	
SHEET. NO.	0	
		REVISION
		0



4						NAME	SIGN.	DATE
3					DESIGNED	DJ		28.07.21
2					DRAWN			
1					CHECKED	DP		28.07.21
REV. NO.	DATE	DESCRIPTION		BY	APPD.	APPROVED	PSP	28.07.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)

JOB NO. CP-012

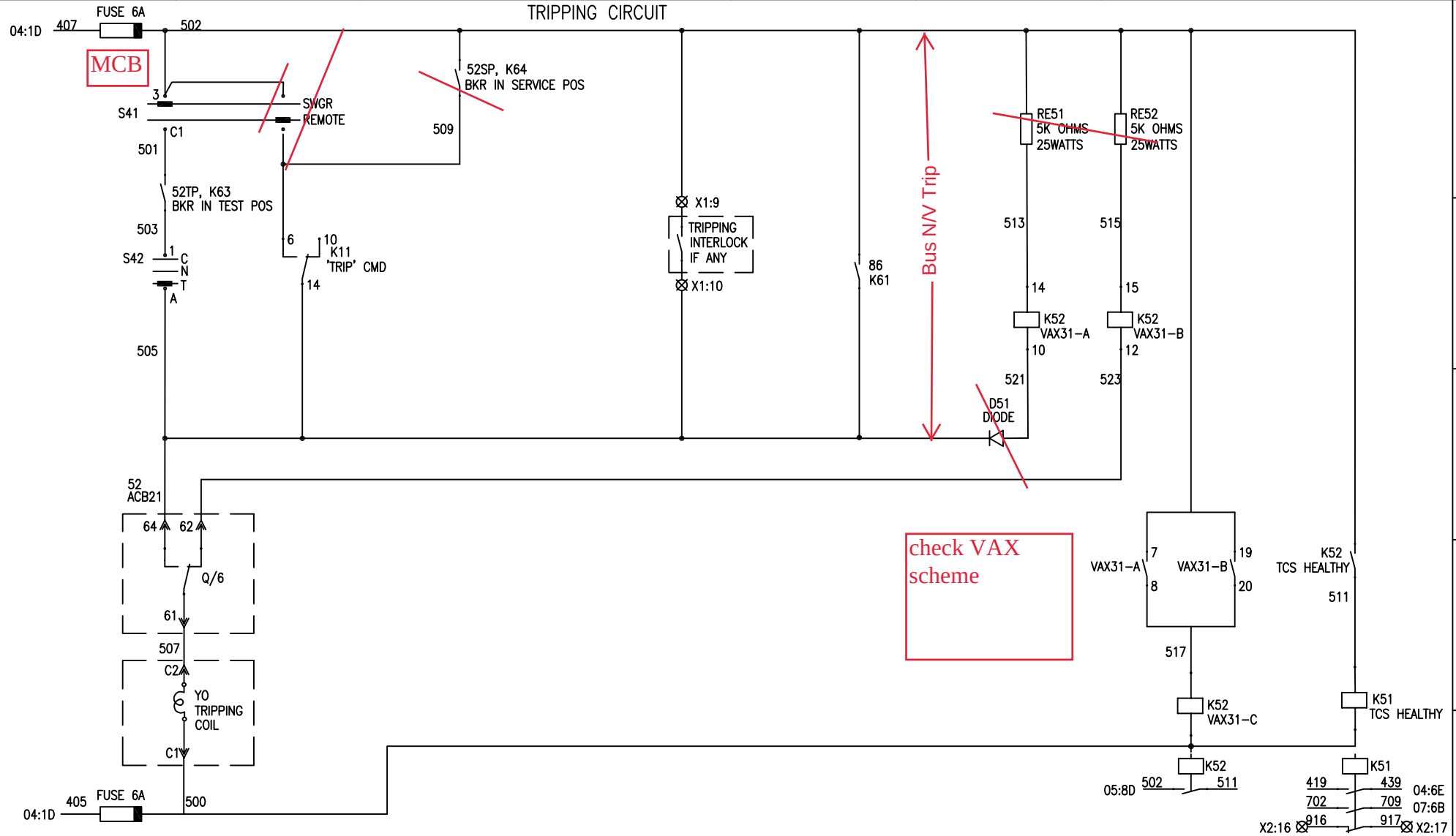
DRG. NO. EP-4-CS-012-014

NO. OF SHEETS		REV.
10	04	

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DRG. NO. EP-4-CS-012-014



INVENTORY NO.	4						NAME	SIGN.	DATE	बी.एच.ई.एल BHEL	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ		28.07.21		TITLE : POWER & CONTROL SCHEME ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)	NO. OF SHEETS	10		
	2					DRAWN						SHEET. NO.	05		
	1					CHECKED	DP		28.07.21						
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP			28.07.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-014

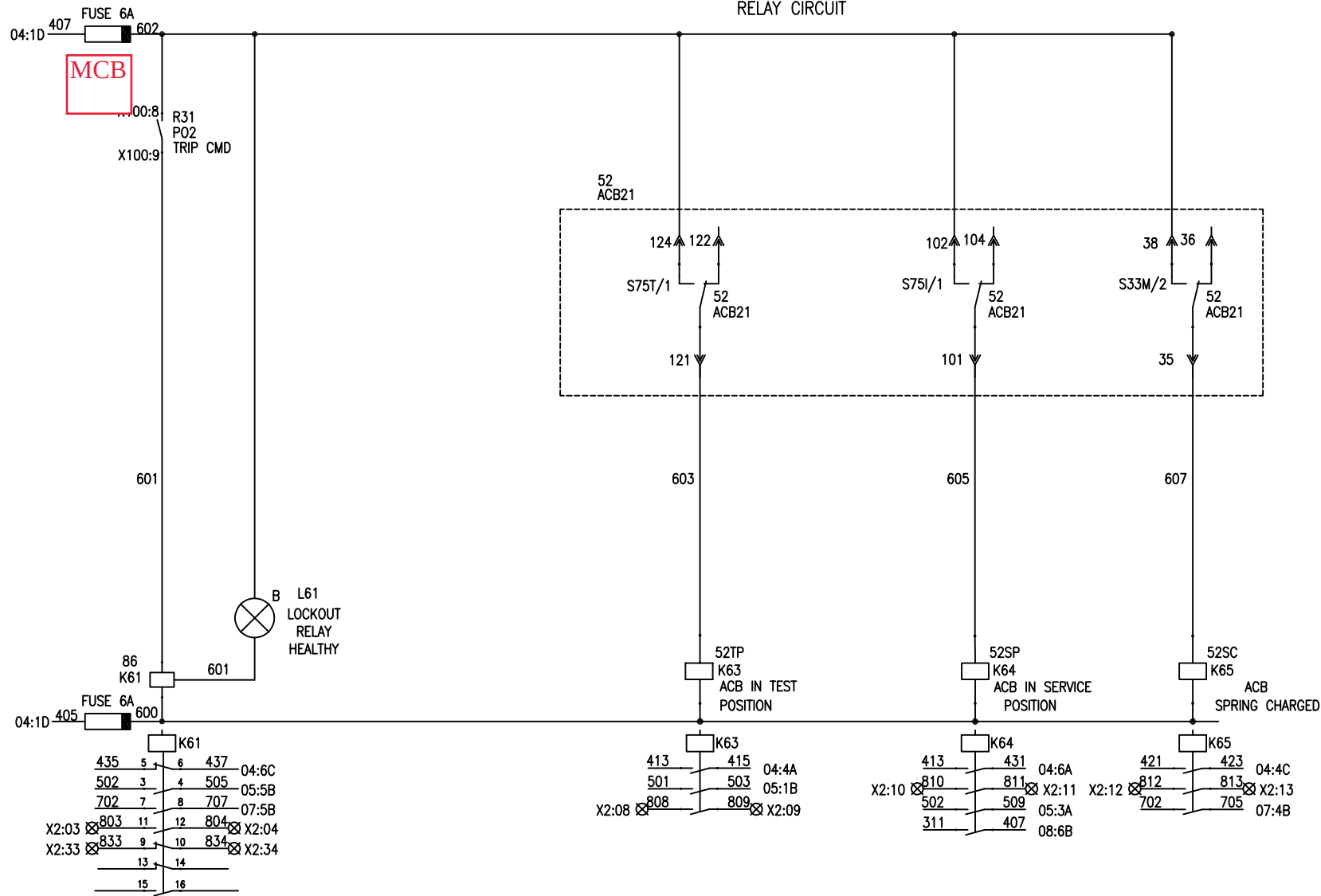
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-014

DRG. NO.



NOTE: Limit switches are shown in isolated position.

INVENTORY NO.

4					NAME	SIGN.	DATE
3					DESIGNED	DJ	28.07.21
2					DRAWN		
1					CHECKED	DP	28.07.21
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	28.07.21

BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME
ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)

NO. OF SHEETS	10
SHEET. NO.	06

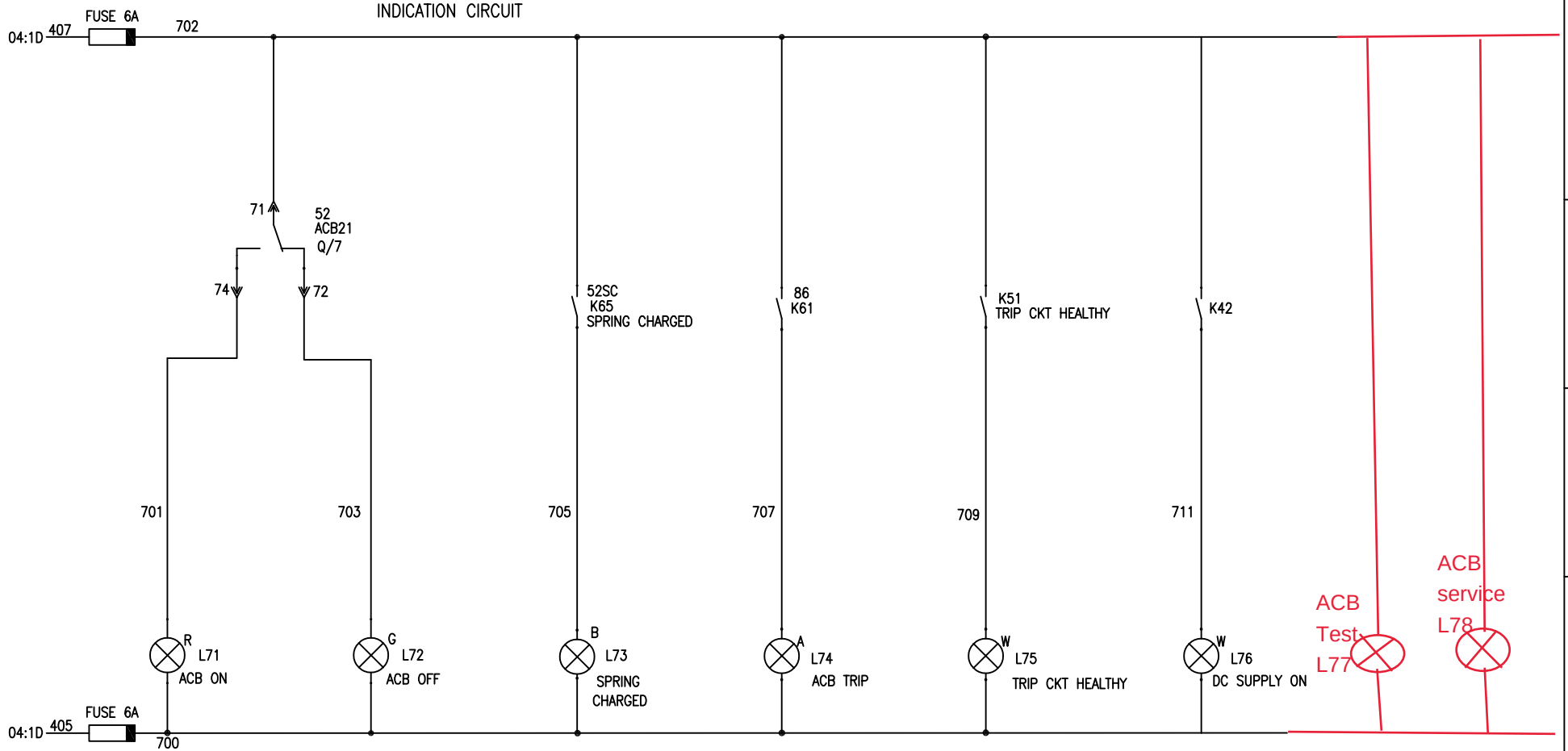
JOB NO. CP-012

DRG. NO. EP-4-CS-012-014

REV. 00

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

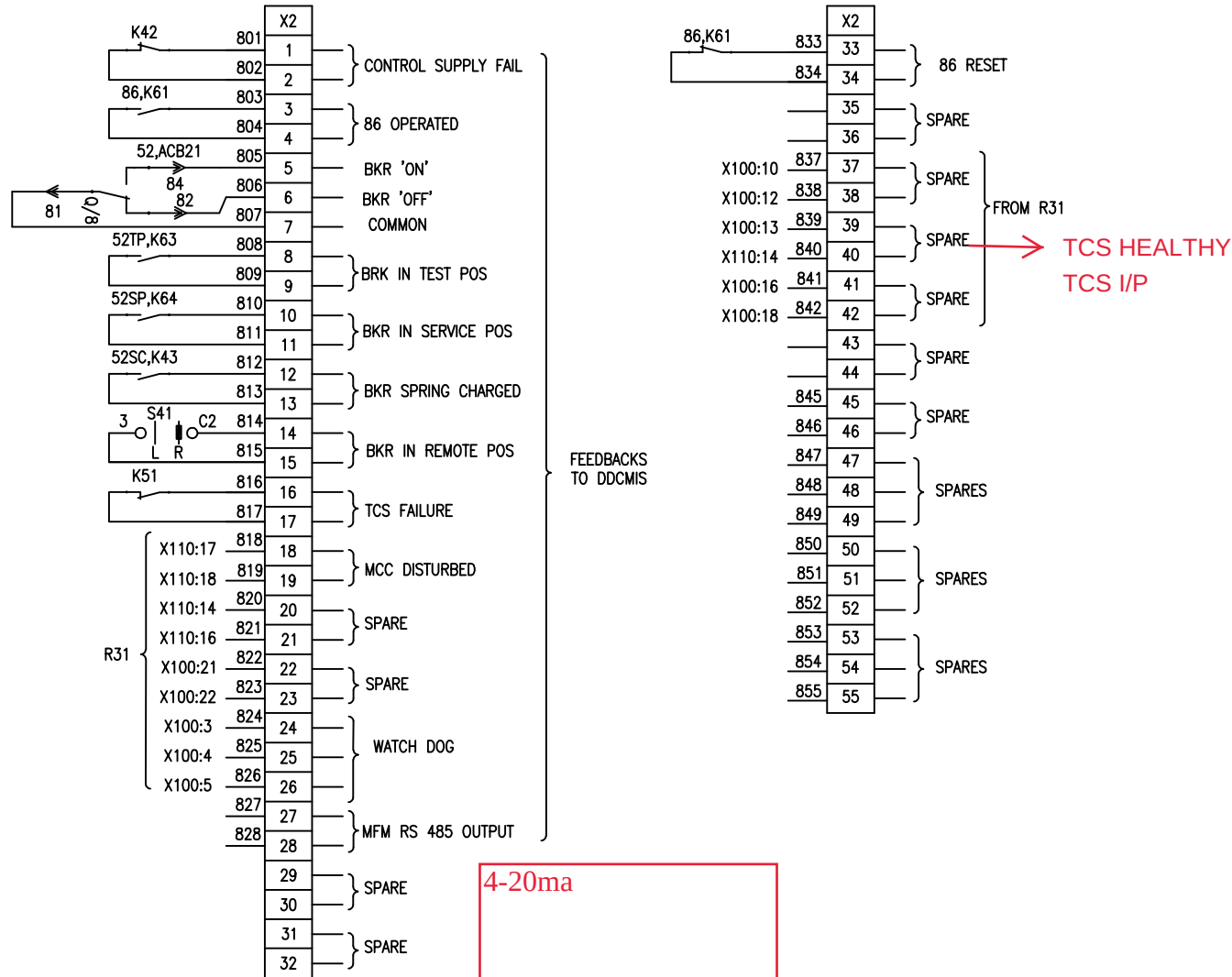


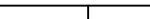
INVENTORY NO.	4					NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE					
	3				DESIGNED	DJ		28.07.21							
	2				DRAWN					TITLE : POWER & CONTROL SCHEME ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)	NO. OF SHEETS	10			
	1				CHECKED	DP		28.07.21			SHEET. NO.	07			
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP		28.07.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-014		REV. 00

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

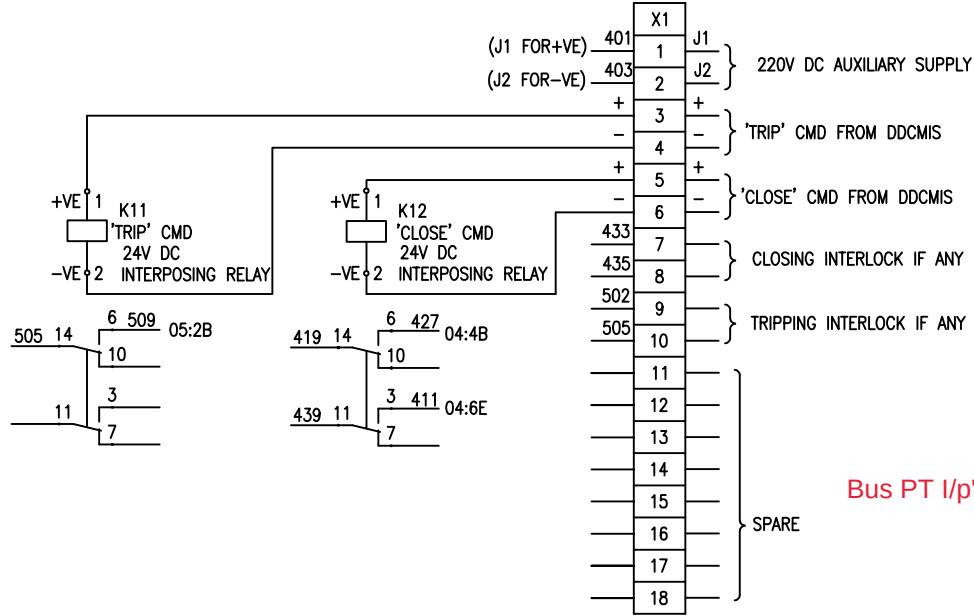
DRG. NO. EP-4-CS-012-014



INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ		28.07.21		TITLE : POWER & CONTROL SCHEME ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)	NO. OF SHEETS	10		
	2					DRAWN						SHEET. NO.	08		
	1					CHECKED	DP		28.07.21						
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP			28.07.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-014

FIRST ANGLE PROJECTION

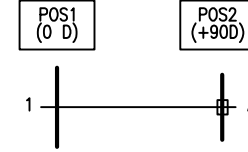
ALL DIMENSIONS ARE IN MM.



Bus PT I/p's

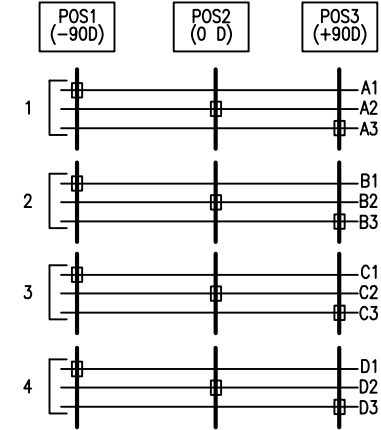
ON/OFF SWITCH

SWITCH SCHEMATIC DIAGRAM



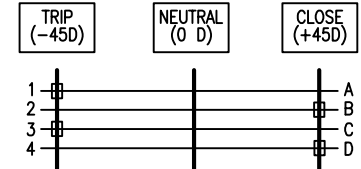
LOCAL/REMOTE SWITCH

SWITCH SCHEMATIC DIAGRAM



TNC SWITCH

SWITCH SCHEMATIC DIAGRAM



INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		28.07.2
	2					DRAWN			
	1					CHECKED	DP		28.07.2
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	28.07.2



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)



NO. OF SHEETS 10
SHEET. NO. 09

JOB NO. CP-012
DRG. NO. EP-4-CS-012-014
REV. 00

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-014

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

6

7

8

BILL OF MATERIAL FOR EP-4-CS-012-014

SL NO.	DESCRIPTION	MAKE	QTY
1	ACB EDO FP****A 50KA WITHOUT RELEASE	ABB	1
2	AUX CONTACTOR WITH 2NO+2NC 220V DC	C&S ELECTRIC	3
3	AUX CONTACTOR WITH 4NO 220V DC	C&S ELECTRIC	4
4	NUMERICAL RELAY FOR OUTGOING - IEC REF615	ABB	1
5	LOCK OUT RELAY 4NO+3NC	ABB	1
6	CT ****/1A CL-1.0 15VA	KALPA/AE/PRECISE/NEWTEK/PRAGATHI/INDCOIL	3
7	CT ****/1A OR 5A CL-5P20 15VA	KALPA/AE/PRECISE/NEWTEK/PRAGATHI/INDCOIL	3
8	AMMETER 0-****A	RISHABH	1
9	AMMETER SELECTOR SWITCH(C10P439AM)	RECOM	1
10	MULTI FUNCTION METER	SECURE	1
11	ON OFF SWITCH 25A 220V DC(SPD3125BB2/TB3)	RECOM	1
12	3POLE 2WAY SWITCH TNC 25A 220V DC LOCKABLE(BC251P244BB1/L)	RECOM	1
13	BREAKER CONTROL SWITCH TNC 25A 220V DC LOCKABLE(SPD13416BB3/LM/TA3/L)	RECOM	1
14	INTERPOSING RELAY	JYOTI	2
15	FUSE BASE WITH FUSE 6A AC	L&T	3
16	FUSE BASE WITH FUSE 6A DC	L&T	8
17	INDICATING LAMP RED 220V DC	REPUTED	1
18	INDICATING LAMP GREEN 220V DC	REPUTED	1
19	INDICATING LAMP BLUE 220V DC	REPUTED	1
20	INDICATING LAMP AMBER 220V DC	REPUTED	1
21	INDICATING LAMP WHITE 220V DC	REPUTED	1
22	5K OHM 25WATTS 220V DC	REPUTED	1
23	DIODE 220V DC WITH HEAT SINK		2
24	CTTB 10 SQ.MM		14
25	DC POWER TERMINAL BLOCK		4
26	TERMINAL BLOCK 4SQ.MM		68

Add 2 more indicating lamps for ACB test and service in BOM.

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		28.07.2
	2					DRAWN			
	1					CHECKED	DP		28.07.2
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	28.07.2



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
ACB OUTGOING CONTROLLED FROM DDCMIS (DAE OG)



NO. OF SHEETS	10
SHEET. NO.	10

JOB NO. CP-012	DRG. NO. EP-4-CS-012-014	REV. 00
----------------	--------------------------	---------

	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)																
	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA																
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE																
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M	<table border="1"> <tr> <td></td> <td align="center">NAME</td> </tr> <tr> <td align="center">DESIGN</td> <td align="center">DJ</td> </tr> <tr> <td align="center">CHECKED</td> <td align="center">DP</td> </tr> <tr> <td align="center">APPROVED</td> <td align="center">PSP</td> </tr> </table>		NAME	DESIGN	DJ	CHECKED	DP	APPROVED	PSP	<table border="1"> <tr> <td align="center">SIGN</td> <td align="center">DATE</td> </tr> <tr> <td></td> <td align="center">19/08/21</td> </tr> </table>	SIGN	DATE		19/08/21
	NAME																
DESIGN	DJ																
CHECKED	DP																
APPROVED	PSP																
SIGN	DATE																
	19/08/21																
Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.																	
03		SIGN	DATE	DEPT	DRAWING NO. EP-4-CS-012												
02																	
01	Revised as per customer transmittal no.894	DJ	01/07/21														
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR SFU INCOMER (E3 IC) - DRAWOUT												

TATA CONSULTING ENGINEERS LIMITED
VENDOR DOCUMENT REVIEW STATUS

☐ A Drawing/Document approved as submitted. Proceed with fabrication/construction.
☒ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/ construction considering our comments.
☐ C Our comments are noted on this marked up print.
☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. _____ Dated 02/09/2021
☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval.
☐ F Correct original of this drawing/document to reflect our comments and resubmit for records.
☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.
☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor.
☐ I Drawing/Document returned without review.
☐ J Print not enclosed.

Reviewed by PSP Date 02/09/2021

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

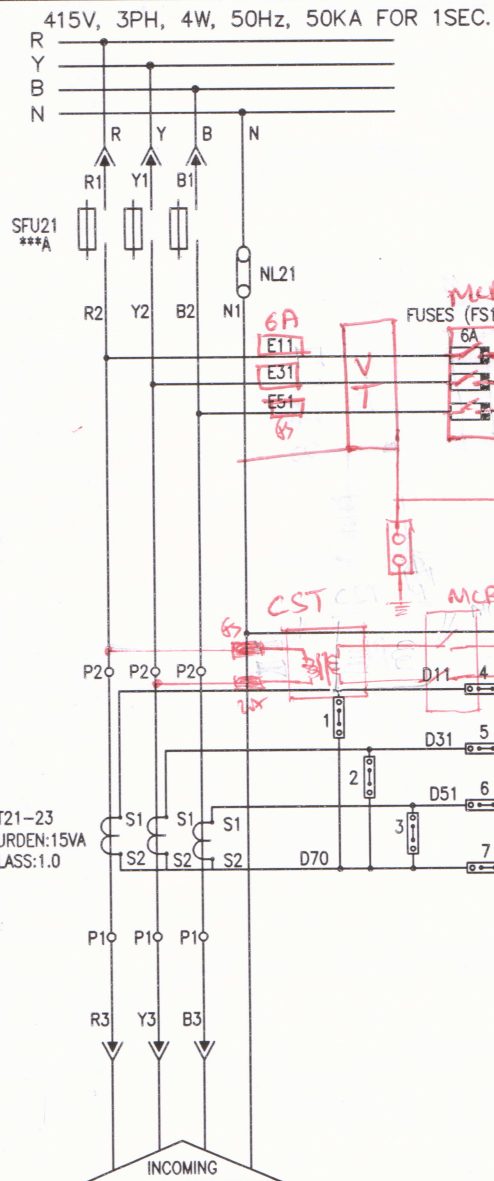
COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-016

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	19.06.21
4						NAME	SIGN.
3					DESIGNED	DJ	19.06.21
2					DRAWN		
1	01.07.21	Revised as per customer transmittal no.894	DJ	DJ	CHECKED	DP	19.06.21
					APPROVED		19.06.21

CT21-23
BURDEN:15VA
CLASS:1.0



4-20mA dual
9/P

VTD

CST

MCB, 2P

CTD

FOR BOTH TEST AND SERVICE POSITION

MFM21

PT INPUT		CT INPUT		AUX SUPPLY		RS-485	
V1	V2	V3	V4	S1	S2	S1	S2
P	N	+	-	SG			

201 X1:1
202 X1:2 } RS 485

CTTB

D11	XC
D31	1
D51	2
	3
	4
	5
D73	6
	7
	8

FOR CT SHORTING

BILL OF MATERIAL FOR EP-4-CS-012-016

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	CT **/1A CL-1 15VA	KALPA	3
4	FUSE BASE 32A	L&T	3
5	FUSE 2A	L&T	3
6	MULTI FUNCTION METER	SECURE	1
7	AMMETER (0-***A)	RISHABH	1
8	AMMETER SELECTOR SWITCH	RECOM	1
9	INDICATING LAMP RED 240V AC	CUSTOMER APPROVED	2
10	INDICATING LAMP YELLOW 240V AC	CUSTOMER APPROVED	2
11	INDICATING LAMP BLUE 240V AC	CUSTOMER APPROVED	1
12	TERMINAL BLOCK 4SQ.MM		10
13	CT TERMINAL BLOCK 4SQ.MM		8

14. MCB, 3P, 6A
15. MCB, 2P, 6A
16. CST, 100VA

EATON
EATON
PRAGATI

X1	1	X1	1
201	2	2	2
202	3	3	3
	4	4	4

RS 485

SPARE TERMINAL

17. VTD, 4-20mA dual 9/P Rishab 1
18. CTD, 4-20mA dual 9/P Rishab 1
NOTE:-
1. TB's WILL BE OF STUD TYPE

BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR SFU INCOMER (E3 IC) - DRAWOUT



NO. OF
SHEETS
SHEET.
NO.

02

02

REV.

01

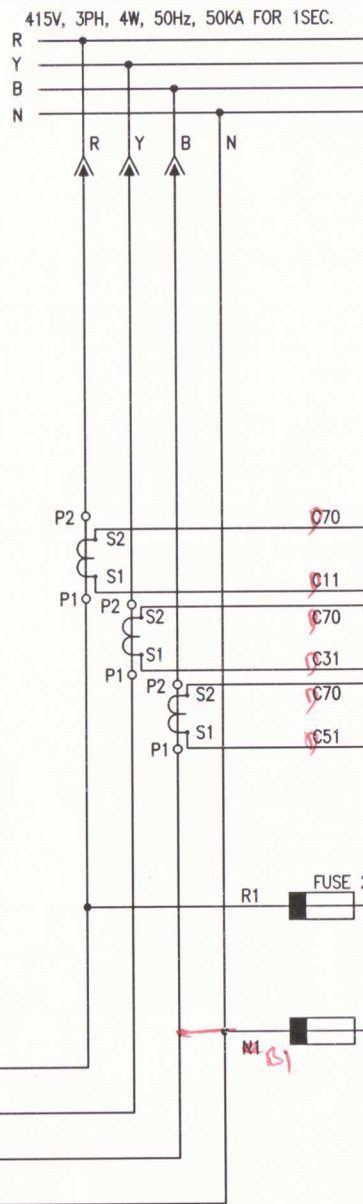
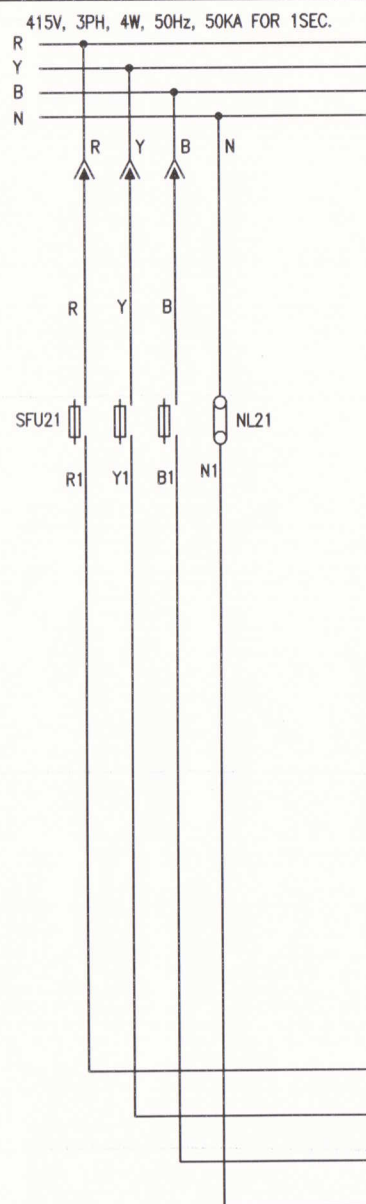
JOB NO. CP-012

DRG. NO. EP-4-CS-012-016

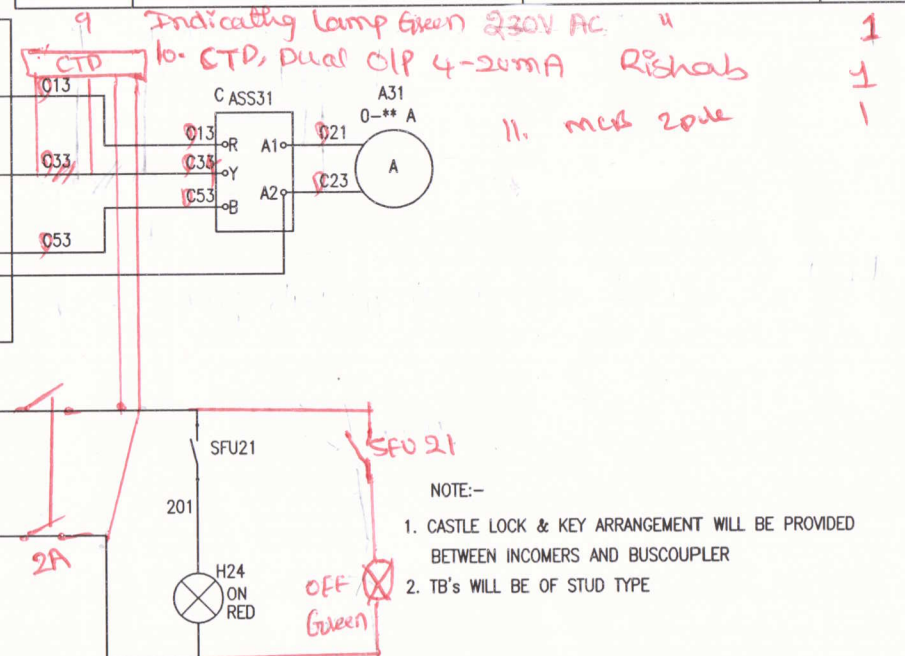


SCALE: NA

CUSTOMER 	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)					
CONSULTANT 	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA					
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M	DESIGN CHECKED APPROVED	NAME SIGN DATE	
				DJ	19/06/21	
				DP	19/06/21	
				PS	19/06/21	
TATA CONSULTING ENGINEERS LIMITED VENDOR DOCUMENT REVIEW STATUS ☐ A Drawing/Document approved as submitted. Proceed with fabrication/construction. ☒ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/ construction considering our comments. ☐ C Our comments are noted on this marked up drawing. ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. 02/09/2021 Dated. 19/06/21 ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval. ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records. ☐ G Drawings/Documents of this category are for information only and not for approval. 19/06/21 Information furnished on the drawing/document is noted. ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor. ☐ I Drawing/Document returned without review. ☐ J Print not enclosed. Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract. Reviewed by <u>Harika</u> REV. 01 Date <u>02/09/2021</u>						
03		SIGN	DATE	DEPT	DRAWING NO. EP-4 NO. OF SHEET. 02	
02						
01	Revised as per customer transmittal no.894	DJ	01/07/21			
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR SFU BUSCOUPLER (E3 BC)–DRAWOUT	



BILL OF MATERIAL FOR EP-4-CS-012-018			
SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	AMMETER (0-***A)	RISHABH	1
4	AMMETER SELECTOR SWITCH	RECOM	1
5	CT ***/1A CL-1 15VA	KALPA	3
6	FUSE BASE 32A WITH 2A FUSE	L&T	2
7	INDICATING LAMP RED 230V AC	CUSTOMER APPROVED	1
8	CTTB		8



FOR BOTH TEST AND SERVICE POSITION

4						NAME	SIGN.	DATE
3					DESIGNED	DJ		19.06.21
2					DRAWN			
1	01.07.21	Revised as per customer transmittal no.891	DJ	DJ	CHECKED	DP		19.06.21
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME FOR SFU BUSCOUPLER (E3 BC) – DRAWOUT

SCALE: NA

JOB NO. CP-012

DRG. NO. FP-4-CS-012-018



NO. OF SHEETS	02
SHEET. NO.	02

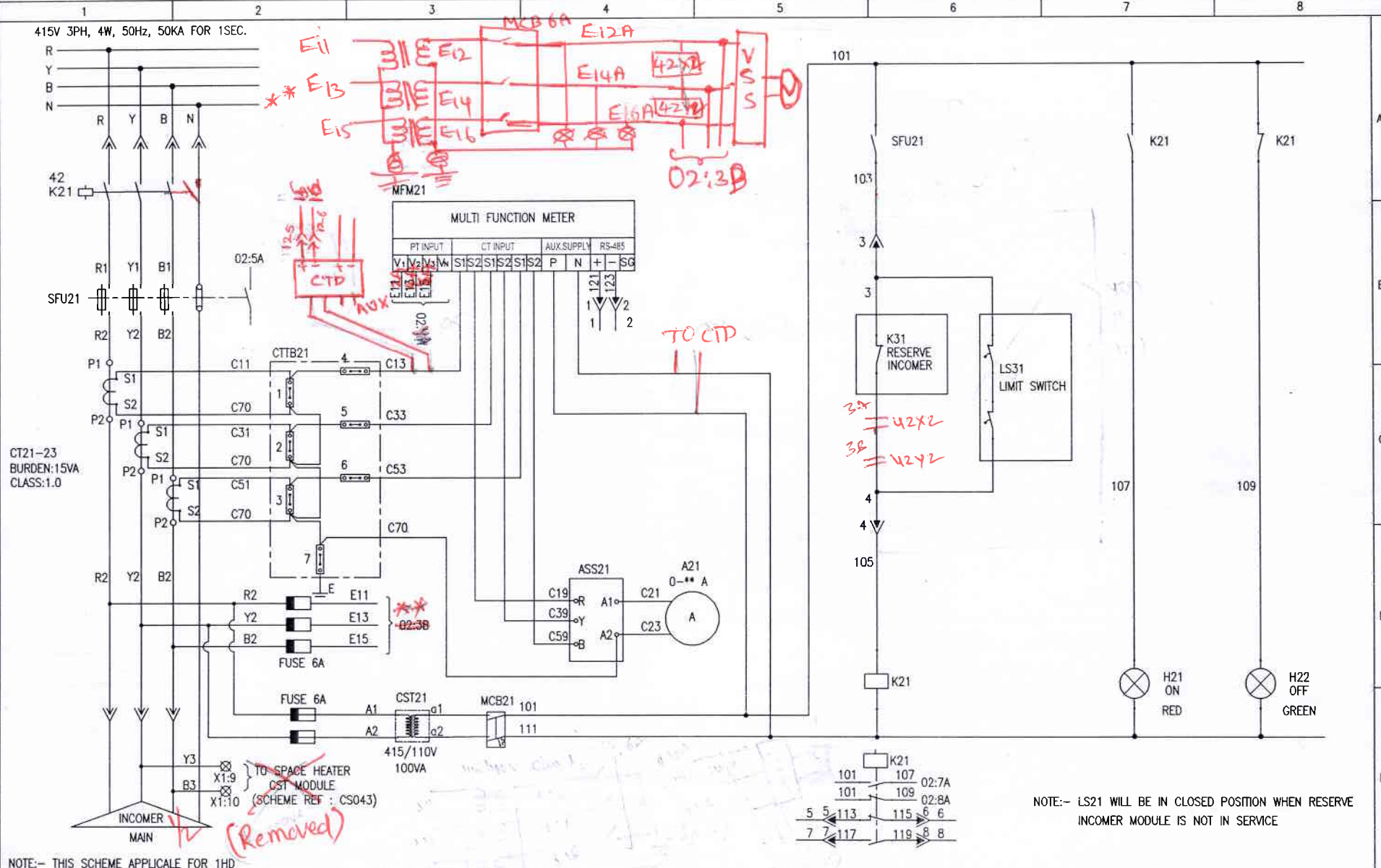
REV	01
-----	----

NOTE: THIS SCHEME IS SUITABLE FOR TWO INCOMERS ~~WITHOUT BUSCOUPLER~~

	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)				TATA CONSULTING ENGINEERS LIMITED VENDOR DOCUMENT REVIEW STATUS											
	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA				☐ A Drawing/Document approved as submitted. Proceed with fabrication/construction. ☒ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/construction considering our comments. ☐ C Our comments are noted on this marked up print. ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. _____ Dated <u>25/08/2021</u> ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval. ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records. ☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.											
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE															
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.					DEPT. CODE M	DESIGN CHECKED APPROVED	<table border="1"> <thead> <tr> <th>NAME</th> <th>SIGN</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DJ</td> <td></td> <td>19/06/21</td> </tr> <tr> <td>DP</td> <td></td> <td>19/06/21</td> </tr> </tbody> </table>	NAME	SIGN	DATE	DJ		19/06/21	DP		19/06/21
NAME	SIGN	DATE														
DJ		19/06/21														
DP		19/06/21														
Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.																
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-020 <i>Harika</i> Reviewed by..... Date <u>25/08/2021</u>											
02	REVISED AS PER CUSTOMER TRANSMITTAL NO.953		19.08.21													
01	REVISED AS PER CUSTOMER TRANSMITTAL NO.891		01.07.21		NO. OF SHEET. 05 REV. 02											
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR CONTACTOR CONTROLLED INCOMER(CC IC)-DRAWOUT											

FIRST ANGLE PROJECTION

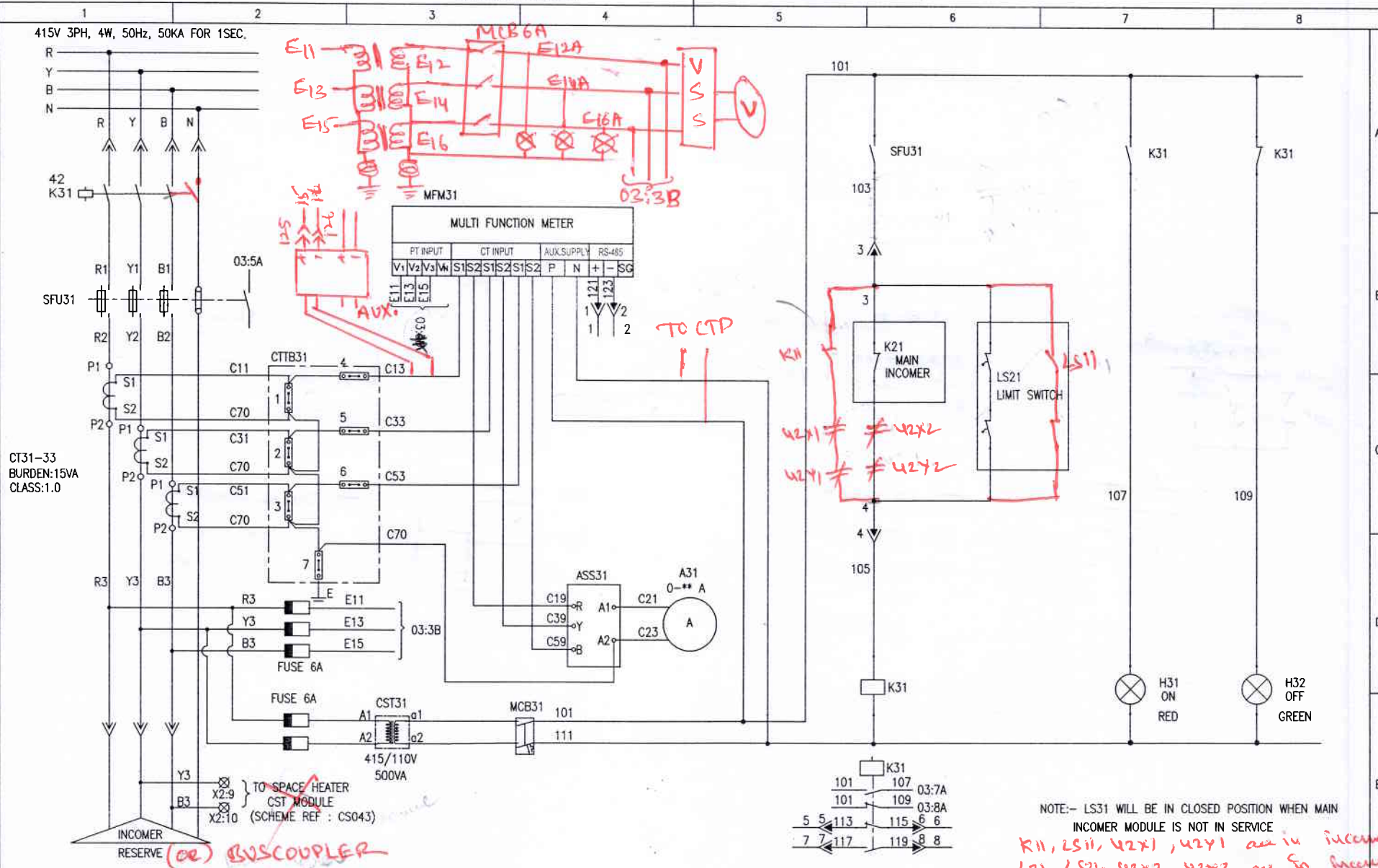
ALL DIMENSIONS ARE IN MM.



PROG. NO. EP-4-CS-012-020

INVENTORY NO.

ALL DIMENSIONS ARE IN MM.



NOTE:- LS31 WILL BE IN CLOSED POSITION WHEN MAIN INCOMER MODULE IS NOT IN SERVICE

INCOMER MODULE IS NOT IN SERVICE

[illegible]

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

6

7

8

A

B

C

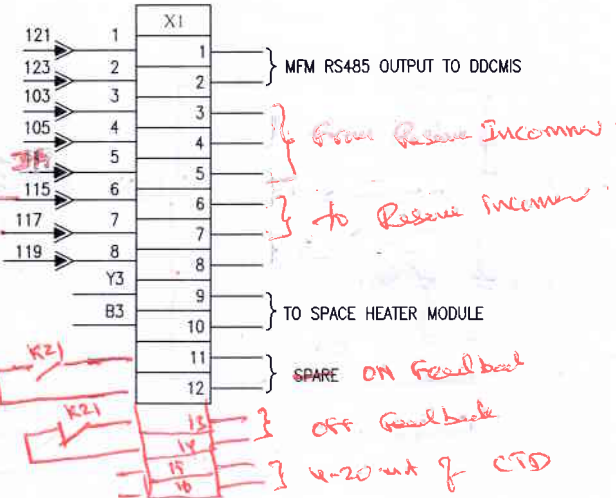
D

E

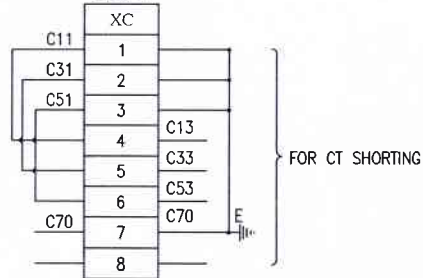
COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-020

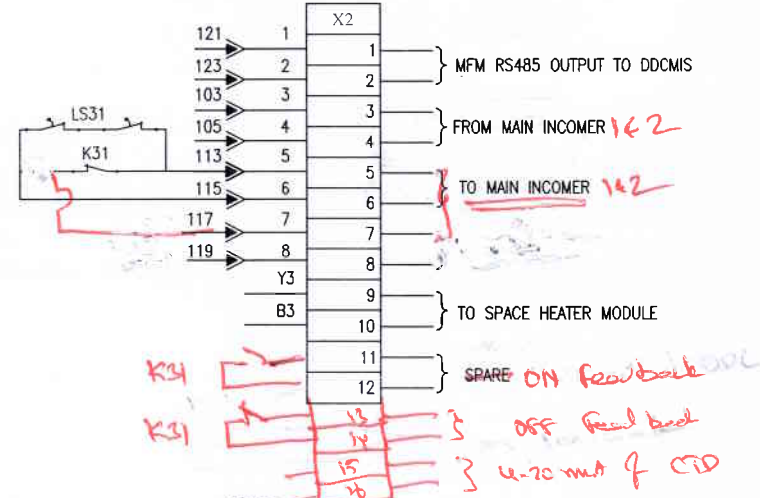
MAIN INCOMER



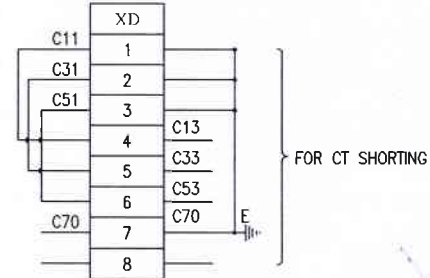
CTTB21



RESERVE INCOMER



CTTB31



NOTE: 1. POWER TB'S ARE STUD TYPE AND SUITABLE FOR RING TYPE LUGS.

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-020	REV. 02
4														
3								DESIGNED	DJ	19.06.21				
2	19.08.21	Revised as per customer transmittal no.953	DJ	DJ	DRAWN									
1	01.07.21	Revised as per customer transmittal no.891	DJ	DJ	CHECKED	DP				19.06.21				



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE: POWER & CONTROL SCHEME
FOR CONTACTOR CONTROLLED INCOMER (CC IC) - DRAWOUT



NO. OF SHEETS 05
SHEET NO. 04

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-020
DRG. NO.

BILL OF MATERIAL FOR EP-4-CS-012-020

MAIN INCOMER

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	POWER CONACTOR **A WITH 2NO+2NC	C&S ELECTRIC <i>4pole</i>	1
4	FUSE BASE 32A	L&T	5
5	FUSE 6A	L&T	5
6	MCB DP 6A AC C-CURVE	EATON	<i>2</i>
7	415/110V CST 100VA	PRAGATI	1
8	MULTI FUNCTION METER	SECURE	1
9	***A AMMETER	RISHABH	1
10	AMMETER SELECTOR SWITCH(C10P439AM)	RECOM	1
11	INDICATING LAMP RED/110V AC	CUSTOMER APPROVED	<i>4</i>
12	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
13	TERMINAL BLOCK 4SQ.MM		18
14	CT TERMINAL BLOCK 4SQ.MM		8

15. Current Transformer *Secure* 11
 16. 415/110V T/F Ch.1 *Pragati* 3
 17. Aux. Relay *2*
 18. VSS with with meter *1*

RESERVE INCOMER

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	POWER CONACTOR **A WITH 2NO+2NC	C&S ELECTRIC <i>4pole</i>	1
4	FUSE BASE 32A	L&T	5
5	FUSE 6A	L&T	5
6	MCB DP 6A AC C-CURVE	EATON	<i>2</i>
7	415/110V CST 100VA	PRAGATI	1
8	MULTI FUNCTION METER	SECURE	1
9	***A AMMETER	RISHABH	1
10	AMMETER SELECTOR SWITCH(C10P439AM)	RECOM	1
11	INDICATING LAMP RED/110V AC	CUSTOMER APPROVED	<i>4</i>
12	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
13	TERMINAL BLOCK 4SQ.MM		18
14	CT TERMINAL BLOCK 4SQ.MM		8

15. Current Transformer *Secure* 1
 16. 415/110V T/F Ch.1 *Pragati* 3
 17. Aux. Relay *2*
 18. VSS with with meter *1*

NOTE: 1. ACTUAL CURRENT RATING OF POWER COMPONENTS AND RANGE OF METERS WILL BE AS PER SLD

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4									
3							DESIGNED	DJ	19.06.21
2	19.08.21	Revised as per customer transmittal no.953	DJ	DJ	DRAWN				
1	01.07.21	Revised as per customer transmittal no.891	DJ	DJ	CHECKED	DP			19.06.21
									19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR CONTACTOR CONTROLLED INCOMER (CC IC) - DRAWOUT

NO. OF SHEETS 05
SHEET NO. 05

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-020

REV. 02

TATA CONSULTING ENGINEERS LIMITED
VENDOR DOCUMENT REVIEW STATUS

- ☐ A Drawing/Document approved as submitted.
Proceed with fabrication/construction.
- ☒ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/construction considering our comments.
- ☐ C Our comments are noted on this marked up print.
- ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. 25/06/2021.
- ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval.
- ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records.
- ☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.
- ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor.
- ☐ I Drawing/Document returned without review.
- ☐ J Print not enclosed.
- Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.

Reviewed by: Flankha Date: 25/08/2021

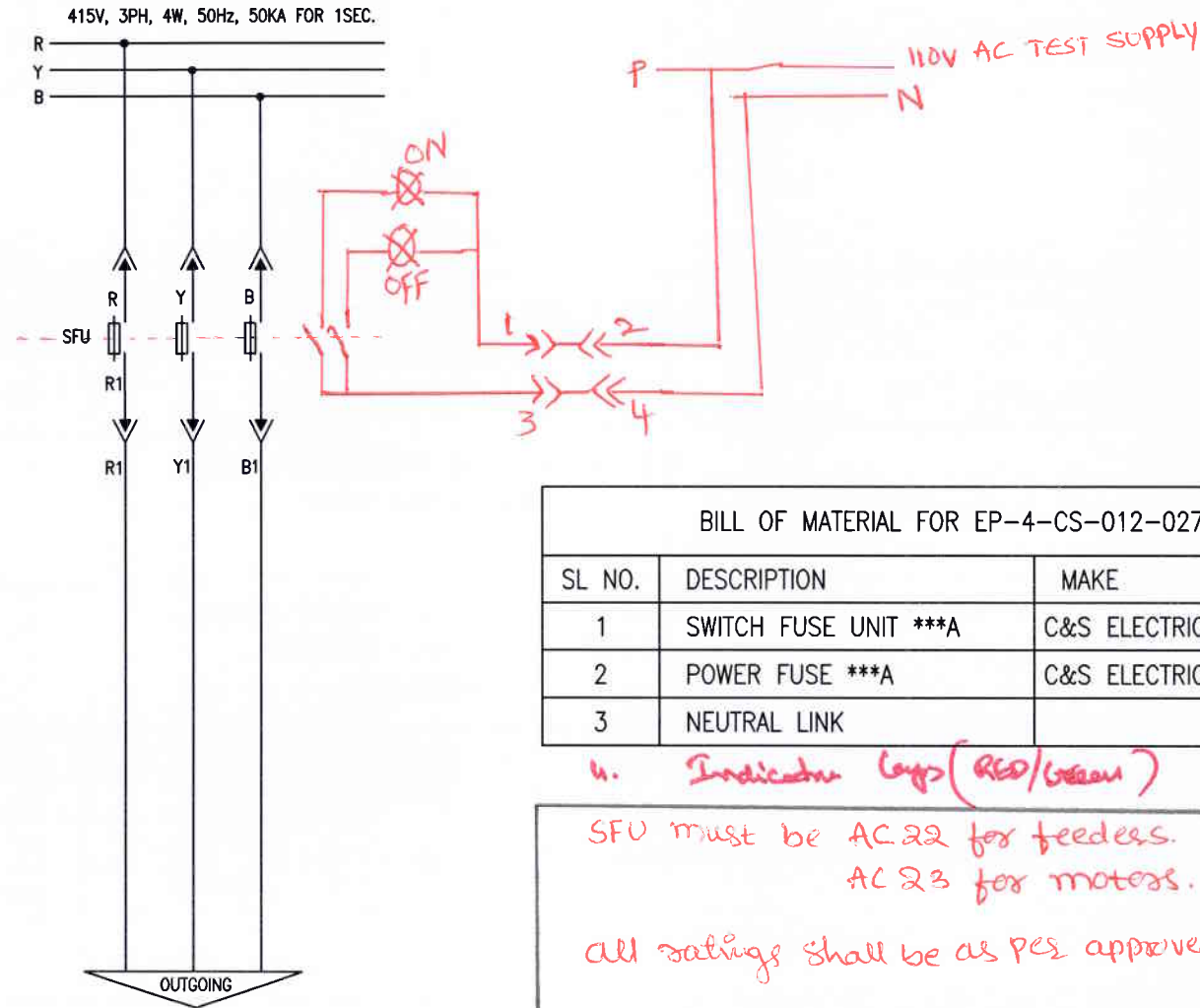
	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)
CONSULTANT 	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE

COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.	DEPT. CODE M		NAME	SIGN	DATE
			DESIGN	DJ	19/06/21
			CHECKED	DP	19/06/21
			APPROVED	PSP	19/06/21

03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-027
02					
01	REVISED AS PER CUSTOMER COMMENTS	DJ	26.07.21		NO. OF SHEET.03
REV HISTORY	DESCRIPTION			SCALE	TITLE: 3-PHASE 3-WIRE SUPPLY OUTGOING (E3) - DRAWOUT

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



BILL OF MATERIAL FOR EP-4-CS-012-027

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	NEUTRAL LINK		1

4. Indicator Lamp (Red/Green) 2

SFU must be AC 22 for feeders.
AC 23 for motors.

all ratings shall be as per approved general notes.

- NOTE : 1. THE ABOVE SCHEME IS APPLICABLE FOR <200A DG SWITCH BOARD
2. TB'S ARE OF STUD TYPE AND SUITABLE FOR RING TYPE LUGS.
3. **--RATING AS PER SLD

INVENTORY NO.

4					NAME	SIGN.	DATE
3					DESIGNED	DJ	19.06.21
2					DRAWN		
1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP	19.06.21
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

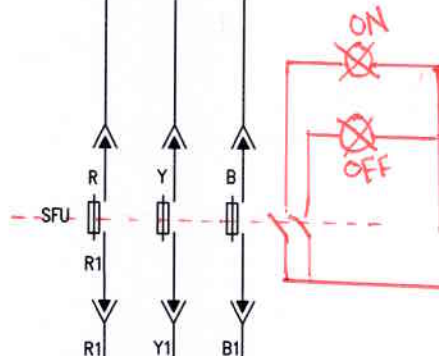
TITLE : POWER & CONTROL SCHEME
3-PHASE 3-WIRE SUPPLY OUTGOING (E3) - DRAWOUT

JOB NO. CP-012

DRG. NO. EP-4-CS-012-027

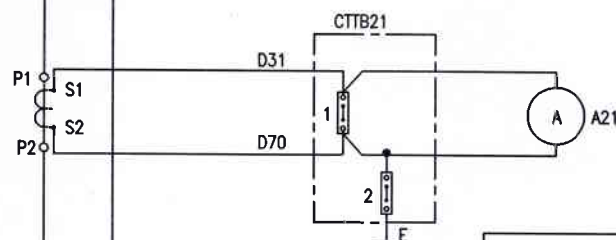
NO. OF SHEETS	03
SHEET. NO.	02
REV.	01

415V, 3PH, 4W, 50Hz, 50KA FOR 1SEC.

R
Y
B

P 110V AC TEST SUPPLY

N



OUTGOING

BILL OF MATERIAL FOR EP-4-CS-012-027

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	NEUTRAL LINK		1
4	AMMETER	RISHABH	1
5	CURRENT TRANSFORMER	KALPA	1
6	CT TERMINAL BLOCKS		3

NOTE : 1. THE ABOVE SCHEME IS APPLICABLE FOR >200A DG SWITCH BOARD
 2. TB'S ARE OF STUD TYPE AND SUITABLE FOR RING TYPE LUGS.
 3. **--RATING AS PER SLD

EP-4-CS-012-027

DRG. NO.

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4									
3							DESIGNED	DJ	19.06.21
2							DRAWN		
1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP			19.06.21
									19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
 SOLAR BUSINESS DIVISION BANGALORE

TITLE : **POWER & CONTROL SCHEME**
 3-PHASE 3-WIRE SUPPLY OUTGOING (E3) - DRAWOUT



NO. OF SHEETS 03
 SHEET NO. 03

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-027

REV. 01

	CUSTOMER TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)				
	CONSULTANT TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA				
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M	NAME DESIGN CHECKED APPROVED	DJ DP PSP
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-01 NO. OF SHEET.05 TITLE:SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER-30MW (DK2)
02					
01	REVISED AS PER CUSTOMER COMMENTS	DJ	26.07.21		
REV HISTORY	DESCRIPTION			SCALE	

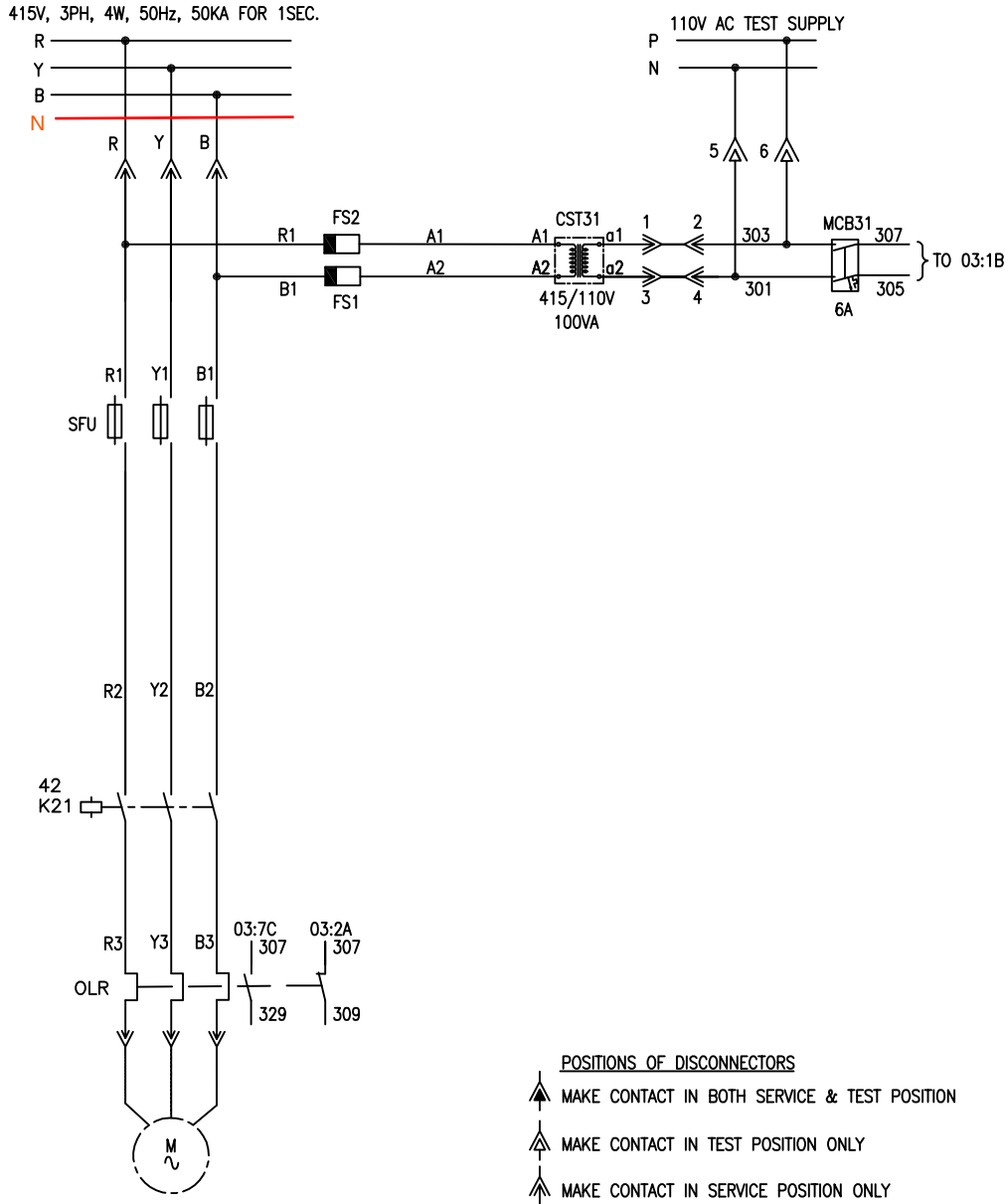
TATA CONSULTING ENGINEERS LIMITED
VENDOR DOCUMENT REVIEW STATUS
☐ A Drawing/Document approved as submitted.
 Proceed with fabrication/construction.
☒ B Drawing/Document approved subjected to
 comments noted. Proceed with fabrication/
 construction considering our comments.
☐ C Our comments are noted on this marked up
 print.
☐ D Our comments are noted on this marked up print.
 to the forwarding transmittal letter No.
 Dated: 12/08/2021
☐ E Correct original of this drawing/document to
 reflect our comments and resubmit for approval
☐ F Correct original of this drawing/document to
 reflect our comments and resubmit for approval
☐ G Drawings/Documents of this category are for
 information only and not for approval.
 Information furnished on the drawing/document
 is noted.
☒ H Drawing/Document reviewed against our
 previous comments and other revisions
 highlighted and identified by the vendor.
☐ I Drawing/Document returned without review.
☐ J Print not enclosed.
 Approval conveyed herein neither relieves the
 Vendor/Contractor of his contractual obligations and
 his responsibilities for correctness of dimensions,
 materials of construction, weights, quantities, design
 details, assembly fits, performance requirements and
 conformity of the supplies with the Indian Statutory
 Laws as may be applicable, nor does it limit the
 purchaser's rights under the contract.

SIGN _____
 DATE 19/06/21

19/06/21

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

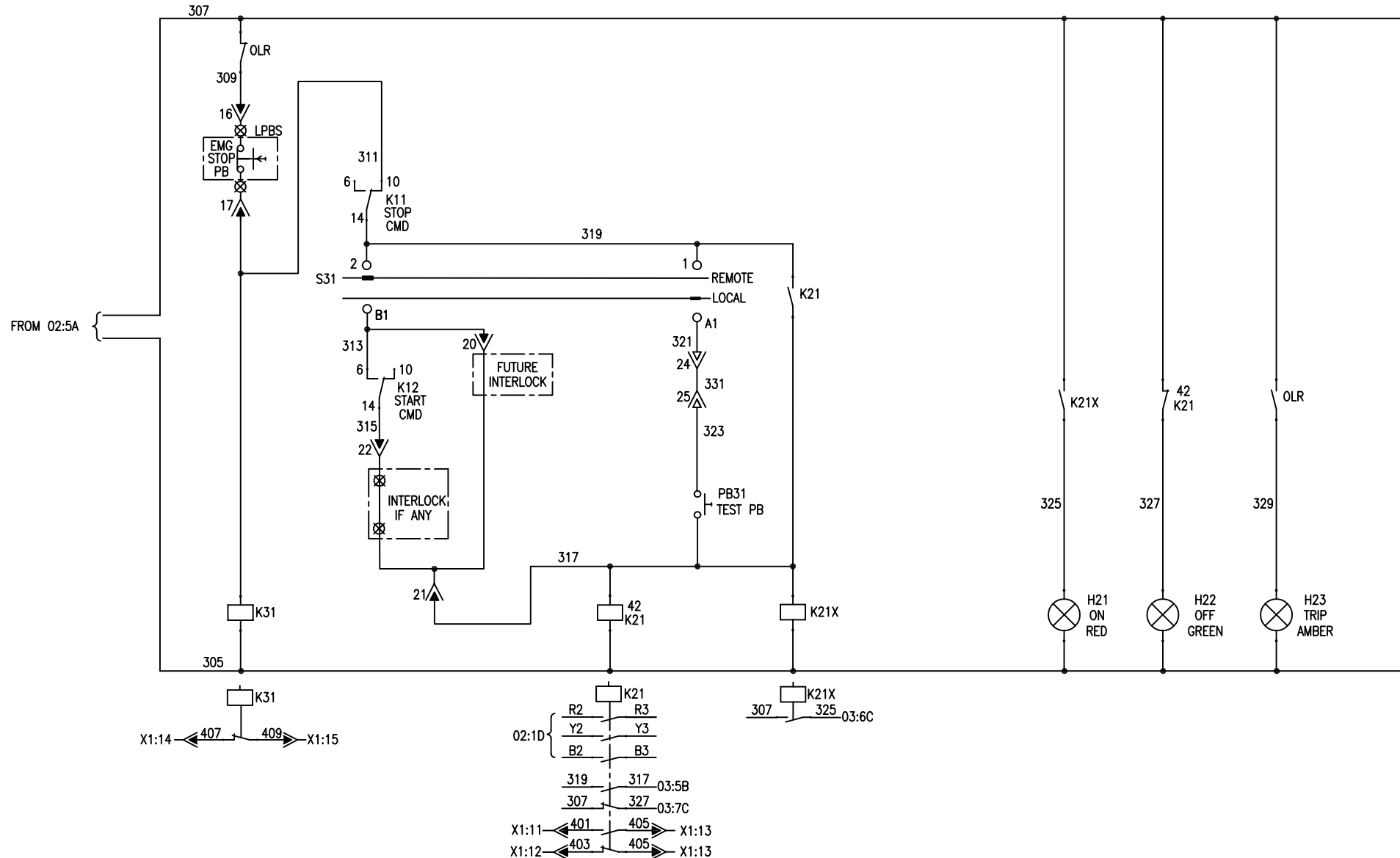


INVENTORY NO.	4					NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ	19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER <30KW (DK2)	NO. OF SHEETS	05		
	2					DRAWN					SHEET. NO.	02		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS			DJ	DJ	CHECKED			DP	19.06.21		
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED			PSP	19.06.21	SCALE: NA	JOB NO. CP-012

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DRG. NO. EP-4-CS-012-031



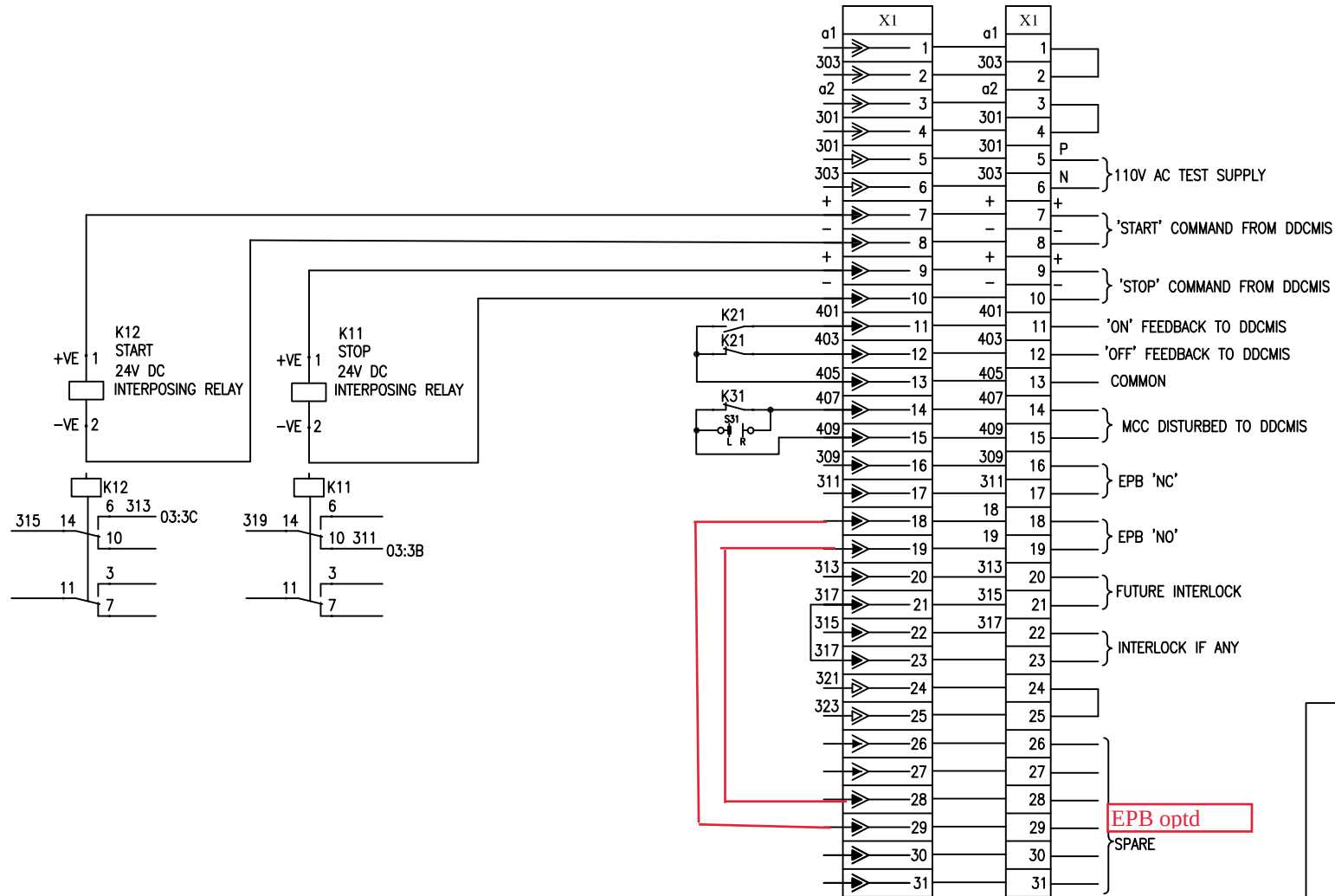
NOTE: TEST PB WILL BE ACCESSIBLE ONLY WHEN DOOR IS OPEN

INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER <30KW (DK2)	NO. OF SHEETS	05		
	2					DRAWN						SHEET. NO.	03		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS			DJ	DJ	CHECKED	DP			19.06.21			
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP			19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-031

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DRG. NO. EP-4-CS-012-031



NOTE: 1. TB'S ARE OF STUD TYPE AND SUITABLE FOR RING TYPE LUGS.

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		19.06.21
	2					DRAWN			
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP		19.06.21
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR UNIDIRECTIONAL MOTOR FEEDER <30KW (DK2)

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-031



NO. OF SHEETS	05
SHEET. NO.	04

REV.
01

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-031

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

6

7

8

BILL OF MATERIAL FOR EP-4-CS-012-031

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	OVER LOAD RELAY WITH 1NO+1NC CONTACT	C&S ELECTRIC	1
4	**A POWER CONTACTOR WITH 2NO+2NC CONTACTS & COIL VOLTAGE IS 110V AC	C&S ELECTRIC	1
5	AUX CONTACTOR WITH 2NO+2NC 110V AC	C&S ELECTRIC	3
6	MCB DP 6A AC	EATON	1
7	415/110V CST 100VA	PRAGATI	1
8	FUSE 2A	L&T	2
9	FUSE BASE 32A	L&T	2
10	2POLE 2WAY SWITCH 10A 110V AC LOCKABLE(SPA5216BB6/TB3/W)	RECOM	1
11	INTERPOSING RELAY	JYOTI	2
12	INDICATING LAMP RED 110V AC	CUSTOMER APPROVED	1
13	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
14	INDICATING LAMP AMBER 110V AC	CUSTOMER APPROVED	1
15	PUSH BUTTON BLACK 110V AC	CUSTOMER APPROVED	1
16	TERMINAL BLOCK 4SQ.MM		31

A

B

C

D

E

INVENTORY NO.

4						NAME	SIGN.	DATE
3					DESIGNED	DJ		19.06.21
2					DRAWN			
1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP		19.06.21
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE :

POWER & CONTROL SCHEME
FOR UNIDIRECTIONAL MOTOR FEEDER <30KW (DK2)



NO. OF SHEETS	05
SHEET. NO.	05

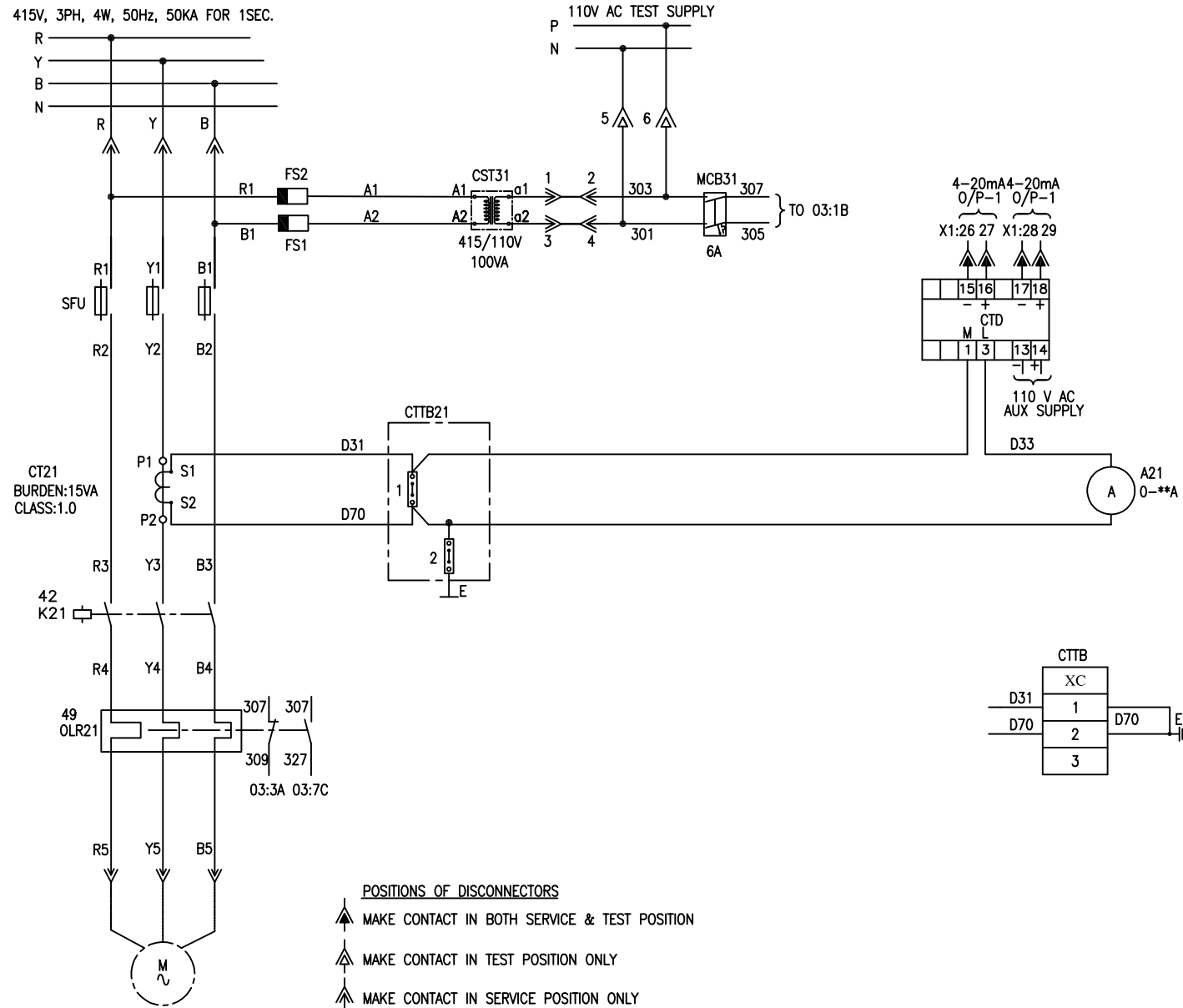
SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-031	REV. 01
-----------	----------------	--------------------------	---------

	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)					
	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA					
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.		DEPT. CODE M		NAME	SIGN	DATE
			DESIGN	DJ		19/06/21
			CHECKED	DP		19/06/21
			APPROVED	PSP		19/06/21
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-033	
02						
01					NO. OF SHEET. 05	REV. 00
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER <30KW WITH REACCELERATION (DK2E)	

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DRG. NO. EP-4-CS-012-033



POSITIONS OF DISCONNECTORS

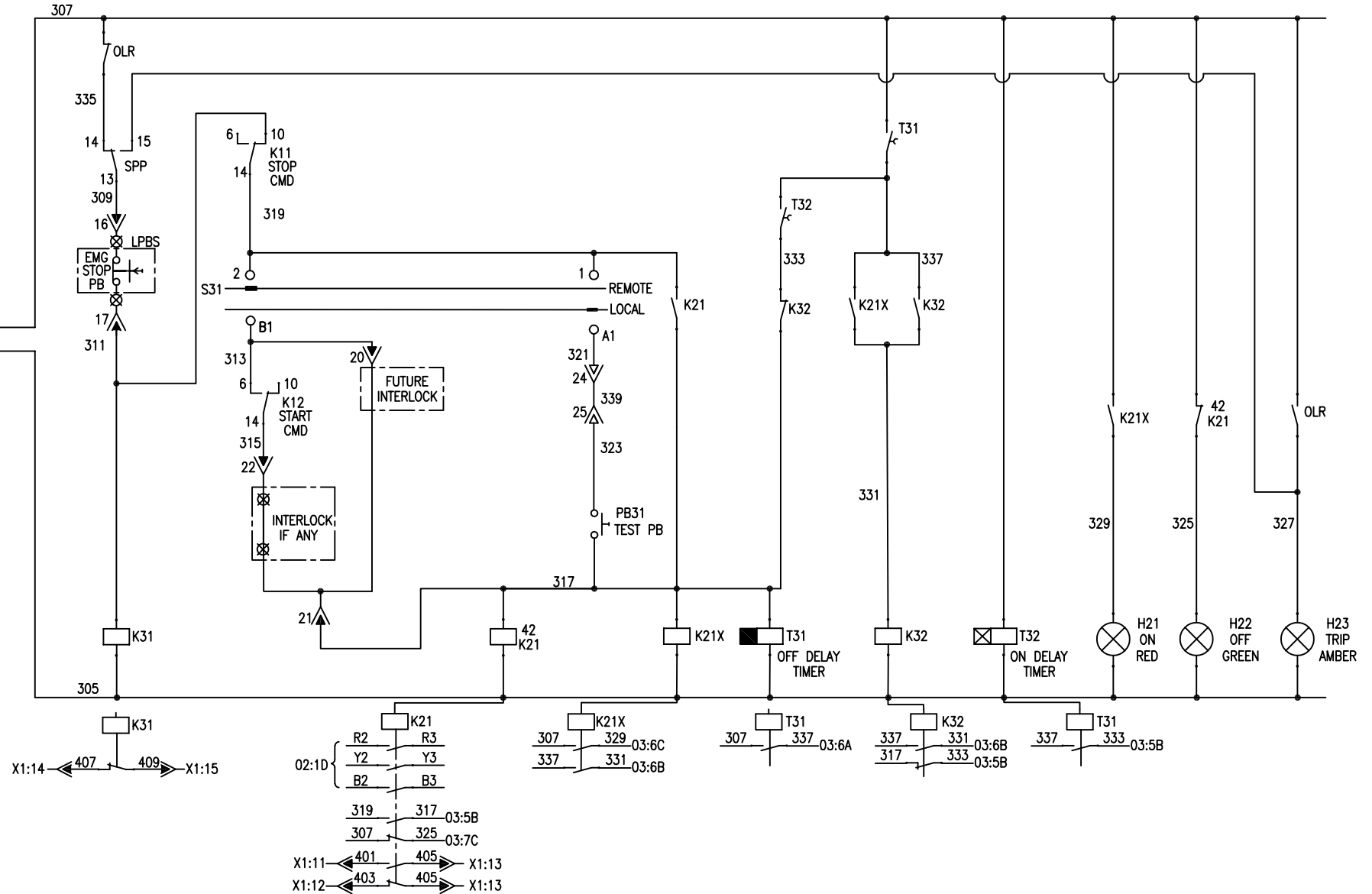
-  MAKE CONTACT IN BOTH SERVICE & TEST POSITION
-  MAKE CONTACT IN TEST POSITION ONLY
-  MAKE CONTACT IN SERVICE POSITION ONLY

INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE		
	3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER <30KW WITH REACCELERATION (DK2E)	NO. OF SHEETS	
	2					DRAWN						SHEET. NO.	02
	1					CHECKED	DP		19.06.21				
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-033	REV. 00

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1 2 3 4 5 6 7 8



NOTE: TEST PB WILL BE ACCESSIBLE ONLY WHEN DOOR IS OPEN

INVENTORY NO.	4						NAME	SIGN.	DATE	बी एच ई एल BHEL	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE			
	3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER <30KW WITH REACCELERATION (DK2E)	NO. OF SHEETS	05	
	2					DRAWN						SHEET. NO.	03	
	1					CHECKED	DP		19.06.21					
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP			19.06.21	SCALE: NA	

TITLE :		NO. OF SHEETS		SHEET. NO.	
POWER & CONTROL SCHEME		05		03	
FOR UNIDIRECTIONAL MOTOR FEEDER <30KW					
WITH REACCELERATION (DK2E)					

COPYRIGHT AND CONFIDENTIAL

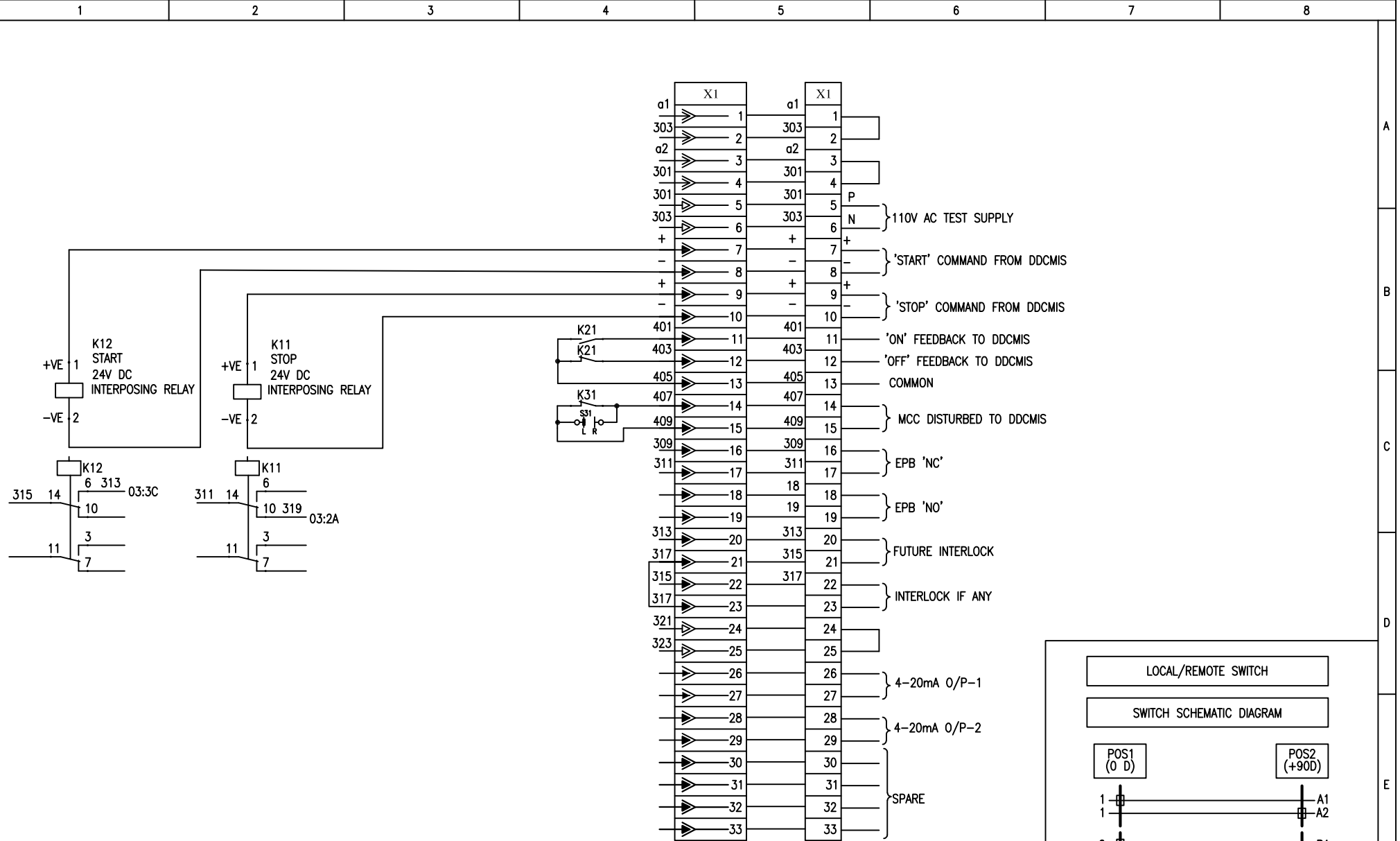
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-033

DRG. NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

e

7

8

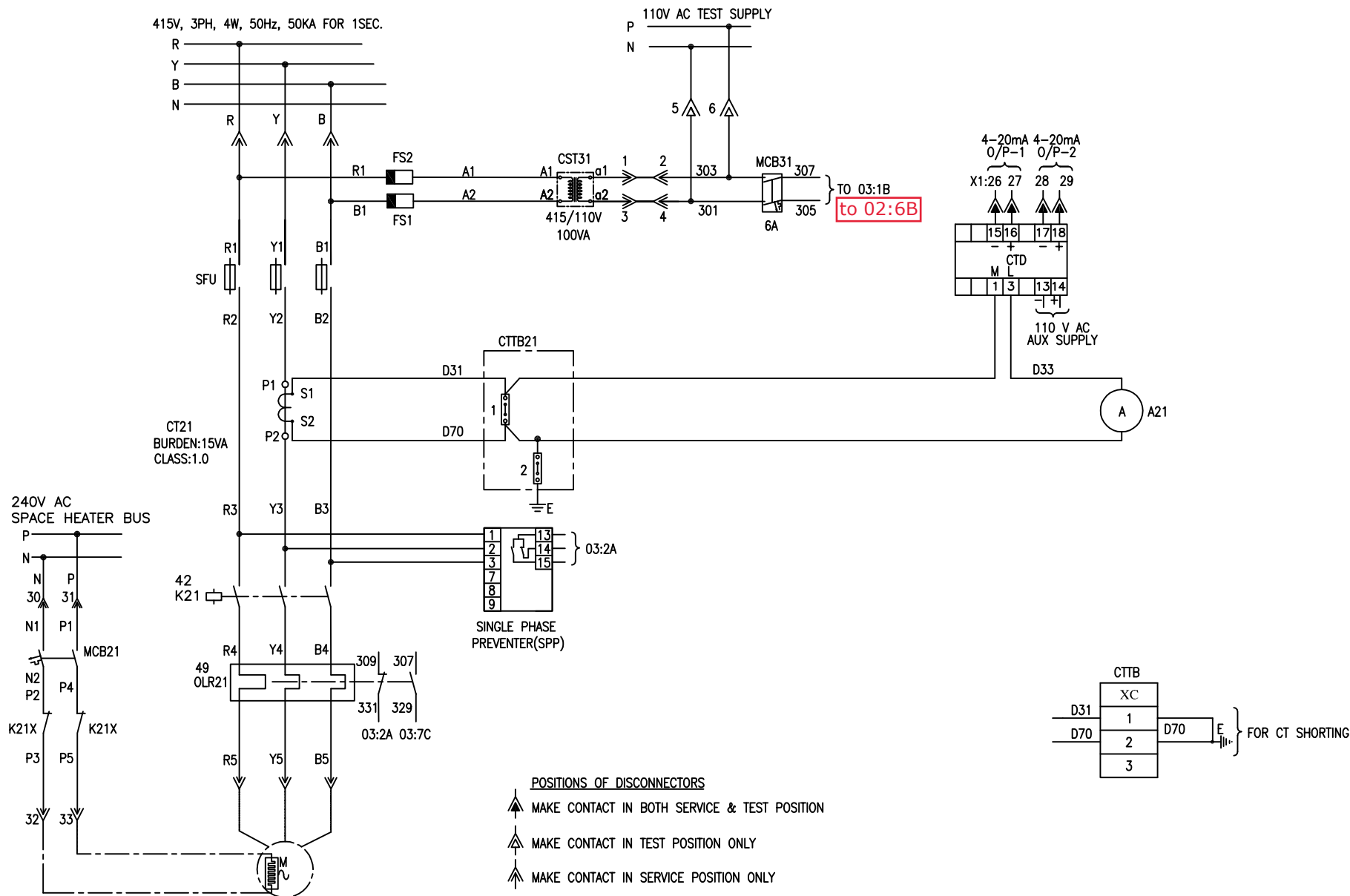
SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	OVER LOAD RELAY WITH 1NO+1NC CONTACT	C&S ELECTRIC	1
4	**A POWER CONTACTOR WITH 2NO+2NC CONTACTS & COIL VOLTAGE IS 110V AC	C&S ELECTRIC	1
5	AUX CONTACTOR WITH 2NO+2NC 110V AC	C&S ELECTRIC	3
6	MCB DP 6A AC	EATON	1
7	415/110V CST 100VA	PRAGATI	1
8	FUSE 2A	L&T	2
9	FUSE BASE 32A	L&T	2
10	2POLE 2WAY SWITCH 10A 110V AC LOCKABLE(SPA5216BB6/TB3/W)	RECOM	1
11	CURRENT TRANSDUCER	SECURE	1
12	OFF DELAY TIMER	L&T	1
13	ON DELAY TIMER	L&T	1
14	INTERPOSING RELAY	JYOTI	2
15	AC AMMETER (0-**A)	RISHABH	1
16	INDICATING LAMP RED 110V AC	CUSTOMER APPROVED	1
17	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
18	INDICATING LAMP AMBER 110V AC	CUSTOMER APPROVED	1
19	PUSH BUTTON BLACK 110V AC	CUSTOMER APPROVED	1
20	CT TERMINAL BLOCK 4SQ.MM		3
21	TERMINAL BLOCK 4SQ.MM		33

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-033

INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER <30KW WITH REACCELERATION (DK2E)	NO. OF SHEETS	05		
	2					DRAWN						SHEET. NO.	05		
	1					CHECKED	DP		19.06.21						
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012

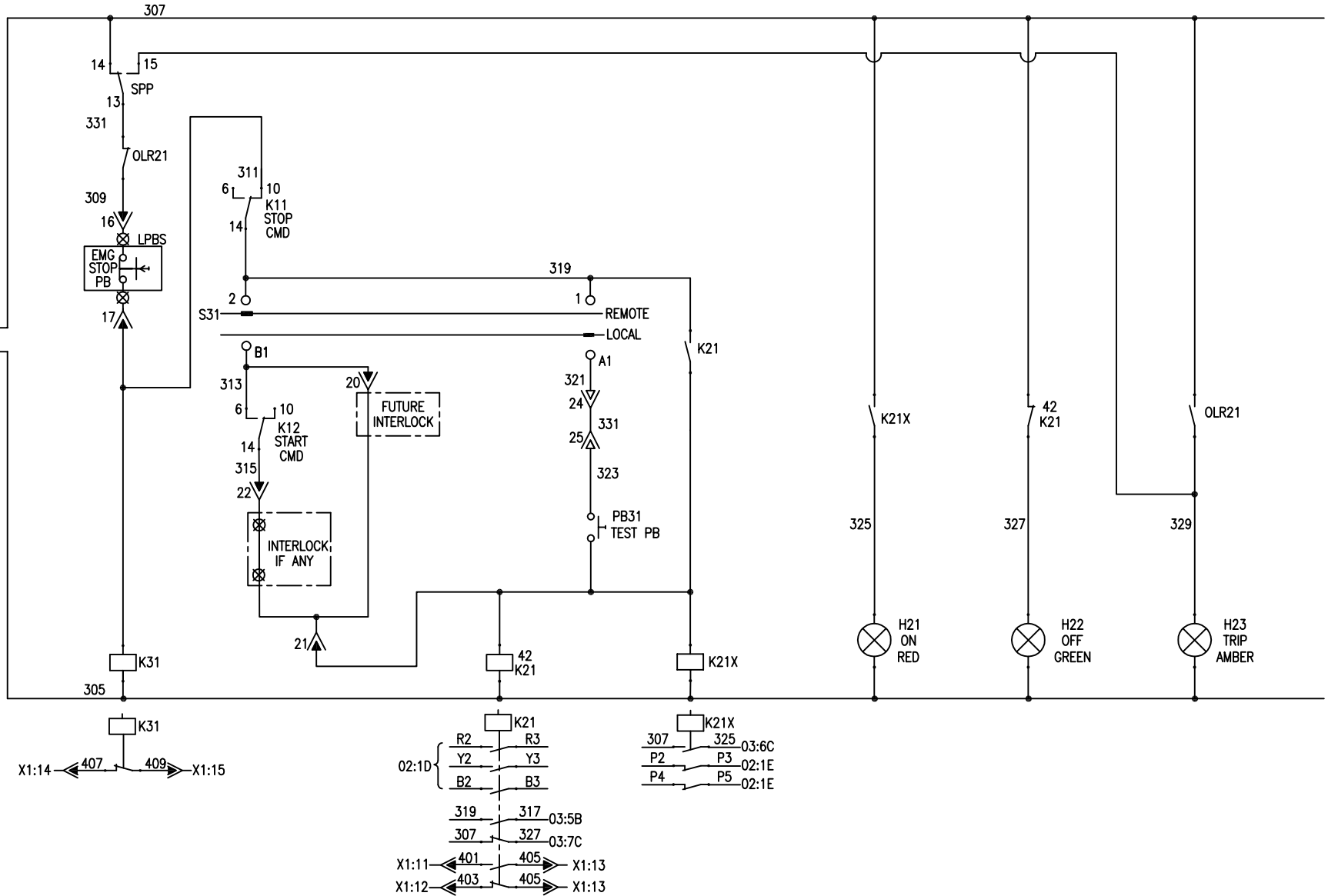
CUSTOMER 	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)				
CONSULTANT 	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA				
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.		DEPT. CODE M		NAME	TATA CONSULTING ENGINEERS LIMITED VENDOR DOCUMENT REVIEW STATUS ☐ A Drawing/Document approved as submitted. Proceed with fabrication/construction. ☒ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/ construction considering our comments. ☐ C Our comments are noted on this marked up print. ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. 31/08/2021 19/06/21 ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval. 19/06/21 ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records. 19/06/21 ☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted. 19/06/21 ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor. ☐ I Drawing/Document returned without review. ☐ J Print not enclosed. Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.
			DESIGN	DJ	
			CHECKED	DP	
			APPROVED	PSP	
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-03
02	REVISED AS PER CUSTOMER TRANSMITTAL NO.953	DJ	19.08.21		
01	REVISED AS PER CUSTOMER COMMENTS	DJ	26.07.21		
REV HISTORY	DESCRIPTION			SCALE	NO. OF SHEET.05 TITLE: SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW (DK21)



INVENTORY NO.	4					NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE			
	3				DESIGNED	DJ		19.06.21					
	2	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.953	DJ	DJ	DRAWN				TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW (DK21)	NO. OF SHEETS	05	
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP	19.06.21			SHEET. NO.	02	
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



NOTE: TEST PB WILL BE ACCESSIBLE ONLY WHEN DOOR IS OPEN

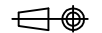
INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4									
3							DESIGNED	DJ	19.06.21
2	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.953	DJ	DJ	DRAWN				
1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP			19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR UNIDIRECTIONAL MOTOR FEEDER 30KW &
ABOVE UPTO 75KW (DK21)



NO. OF SHEETS 05
SHEET. NO. 03

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-032

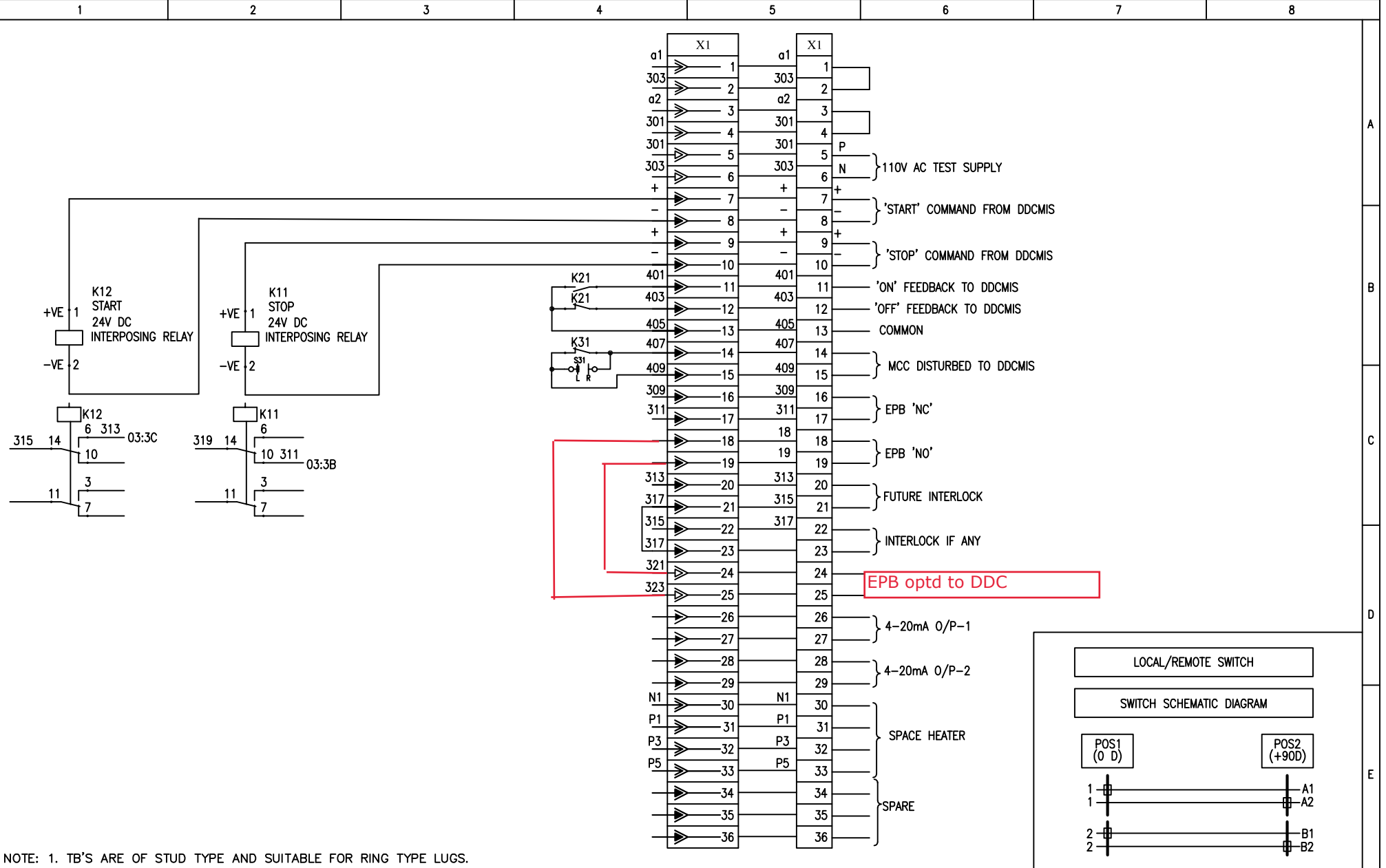
REV. 02

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-032

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW (DK21)	NO. OF SHEETS	05		
	2	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.953		DJ	DJ	DRAWN					SHEET. NO.	04		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS		DJ	DJ	CHECKED	DP				19.06.21			
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		19.06.21			SCALE: NA	JOB NO. CP-012		DRG. NO. EP-4-CS-012-032

FIRST ANGLE PROJECTION

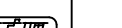
ALL DIMENSIONS ARE IN MM.

1 2 3 4 5 6 7 8

BILL OF MATERIAL FOR EP-4-CS-012-032

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	OVER LOAD RELAY WITH 1NO+1NC CONTACT	C&S ELECTRIC	1
4	**A POWER CONTACTOR WITH 2NO+2NC CONTACTS & COIL VOLTAGE IS 110V AC	C&S ELECTRIC	1
5	AUX CONTACTOR WITH 2NO+2NC 110V AC	C&S ELECTRIC	2
6	SINGLE PHASE PREVENTER(SPP) Self powered	CUSTOMER APPROVED	1
7	MCB DP 6A AC	EATON	1
8	415/110V CST 100VA	PRAGATI	1
9	FUSE 2A	L&T	2
10	FUSE BASE 32A	L&T	2
11	2POLE 2WAY SWITCH 10A 110V AC LOCKABLE(SPA5216BB6/TB3/W)	RECOM	1
12	CURRENT TRANSDUCER	SECURE	1
13	AC AMMETER (0-**A)	RISHABH	
14	INTERPOSING RELAY	JYOTI	2
15	INDICATING LAMP RED 110V AC	CUSTOMER APPROVED	1
16	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
17	INDICATING LAMP AMBER 110V AC	CUSTOMER APPROVED	1
18	PUSH BUTTON BLACK 110V AC	CUSTOMER APPROVED	1
19	CT TERMINAL BLOCK 4SQ.MM		3
20	TERMINAL BLOCK 4SQ.MM		36

SFU, fuses, power contactor rating and category shall be as per approved General notes for LT SwitchGear

4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE			
3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW (DK21)	NO. OF SHEETS		05
2	19.08.21	REVISED AS PER CUSTOMER TRANSMITTAL NO.953		DJ	DJ	DRAWN					SHEET. NO.		05
1	26.07.21	REVISED AS PER CUSTOMER COMMENTS		DJ	DJ	CHECKED	DP	19.06.21					
REV. NO.	DATE	DESCRIPTION		BY	APPD.	APPROVED	PSP	19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-032	REV. 02	

EP-4-CS-18001-030

DRAWING No.

THIS DRAWING AND DESIGN IS THE PROPERTY OF PYROTECH
ELECTRONICS PVT. LTD. UNIT#4, UDAIPUR 313 003 AND MUST NOT
BE COPIED OR LENT WITHOUT THEIR PERMISSION IN WRITING

415V AC, 3PH, 4W, 50Hz, 50KA FOR 1SEC

R
Y
B
N-X1
1
2
3
21
22
23
-FSU21
3-3-D
24
25
26

-K32

240V AC
SPACE HEATER BUSP
N-X2
8
9
217
218
-F21
219
220
-F22
221
-K32
3.2-F
228
229
-X2
28
29-CT22
-CT23
-CT24
*** / 1A
5P20

210

M

3~

-M21

211

212

213

214

215

216

217

218

219

220

221

222

223

224

225

226

227

228

229

230

231

232

233

234

235

236

237

238

239

240

241

242

243

244

245

246

247

248

249

250

251

252

253

254

255

256

257

258

259

260

261

262

263

264

265

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308

309

310

311

312

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

329

330

331

332

333

334

335

336

337

338

339

340

341

342

343

344

345

346

347

348

349

350

351

352

353

354

355

356

357

358

359

360

361

362

363

364

365

366

367

368

369

370

371

372

373

374

375

376

377

378

379

380

381

382

383

384

385

386

387

388

389

390

391

392

393

394

395

396

397

398

399

400

401

402

403

404

405

406

407

408

409

410

411

412

413

414

415

416

417

418

419

420

421

422

423

424

425

426

427

428

429

430

431

432

433

434

435

436

437

438

439

440

441

442

443

444

445

446

447

448

449

450

451

452

453

454

455

456

457

458

459

460

461

462

463

464

465

466

467

468

469

470

471

472

473

474

475

476

477

478

479

480

481

482

483

484

485

486

487

488

489

490

491

492

493

494

495

496

497

498

499

500

501

502

503

504

505

506

507

508

509

510

511

512

513

514

515

516

517

518

519

520

521

522

523

524

525

526

527

528

529

530

531

532

533

534

535

536

537

538

539

540

541

542

543

544

545

546

547

548

549

550

551

552

553

554

555

556

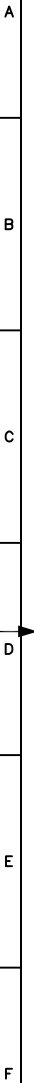
557

558

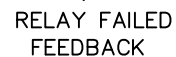
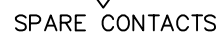
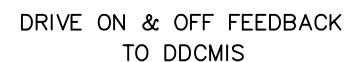
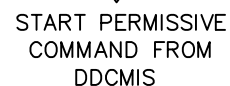
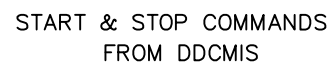
559

560

561



					NAME	DATE	CONSULTANT:- DCPL, NAVI MUMBAI		CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. UNIT: SOLAR BUSINESS DIVISION; BENGALURU						
			DESIGNED		PRAKASH	29.04.21	PROJECTION	PYROTECH ELECTRONICS PVT.LTD. UNIT#4, UDAIPUR 313003		DRAWING No.	EP-4-CS-18001-030	REV.	01		
			CHECKED		JAYPAL	29.04.21		PROJECT:- 1X660MW BHUSAWAL THERMAL POWER STATION; UNIT-6				SHEET NO	3		
01	22.06.21	AS PER DCPL/MAHAGENCO COMMENTS		APPROED	JAYPAL	29.04.21		CUSTOMER:- MAHARASHTRA STATE POWER GENERATION CO. LTD.							
REV	DATE	DESCRIPTION			SCALE: NTS	PROJ.No:37669	BHEL PO No.4500032596; DTD: 12.11.2020		DRG. TITLE:-		SCHEME FOR DOL MOTOR FEEDER 75KW & ABOVE BUT LESS THAN 90KW			NO.OF SHEET	7

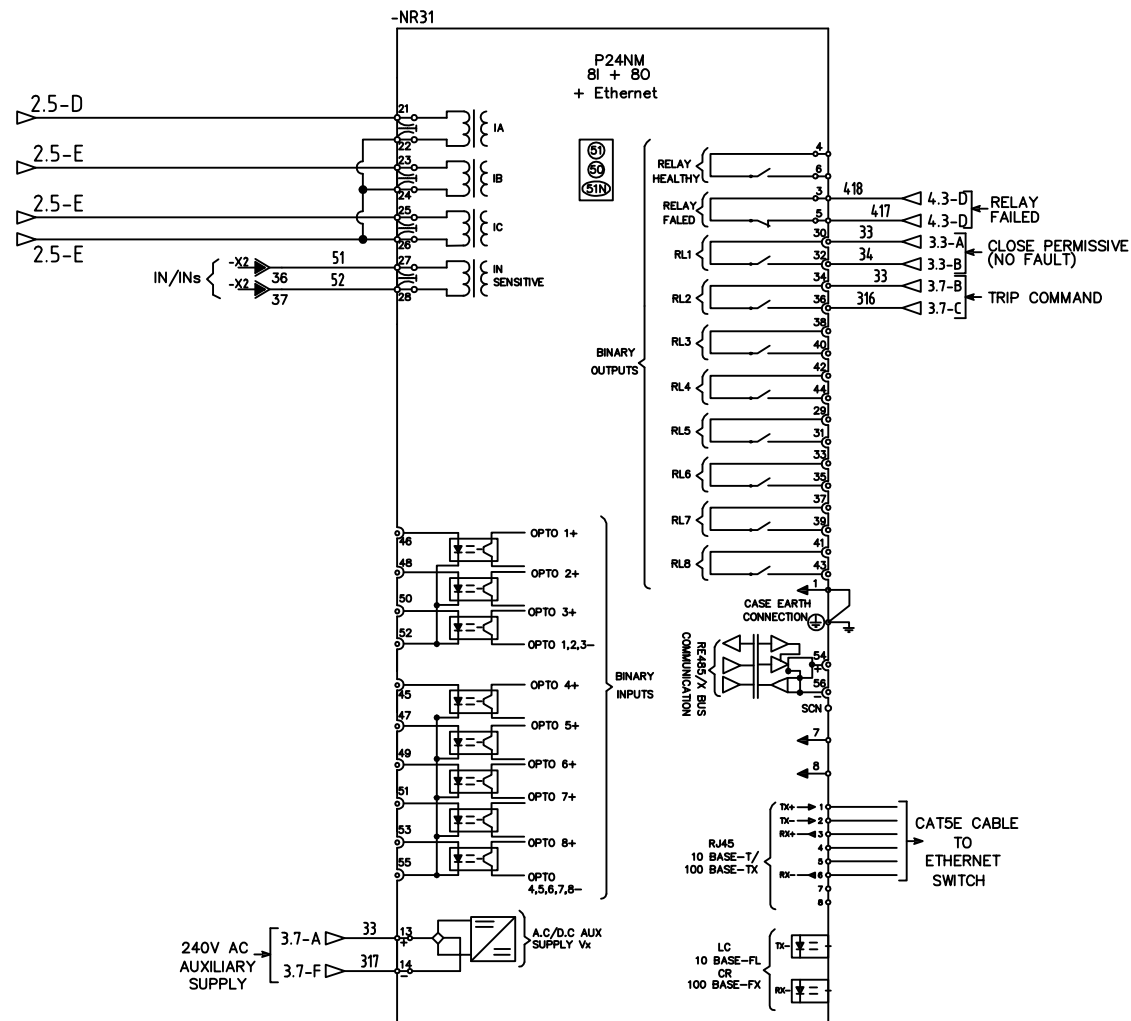


* ALL CONTROL TERMINAL WILL BE OF GREY COLOUR EXCEPT ONLY TERMINAL HAVING DI/DO SIGNAL.

					NAME	DATE	CONSULTANT:- DCPL, NAVI MUMBAI		CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. UNIT: SOLAR BUSINESS DIVISION; BENGALURU				
			DESIGNED	PRAKASH	29.04.21	PROJECTION	PYROTECH ELECTRONICS PVT.LTD, UNIT#4, UDAIPUR 313003			DRAWING No.	EP-4-CS-18001-030	REV.	01
			CHECKED	JAYPAL	29.04.21		PROJECT:- 1X660MW BHUSAWAL THERMAL POWER STATION; UNIT-6					SHEET NO	4
01	22.06.21	AS PER DCPL/MAHAGENCO COMMENTS		APPORED	JAYPAL		29.04.21	CUSTOMER:- MAHARASHTRA STATE POWER GENERATION CO. LTD.					NO.OF SHEET
REV	DATE	DESCRIPTION		SCALE: NTS	PROJ.No:37669	BHEL PO No.4500032596; DTD: 12.11.2020		DRG. TITLE:-		SCHEME FOR DOL MOTOR FEEDER 75KW & ABOVE BUT LESS THAN 90KW			

TERMINAL DETAILS

STRIP-ID	TERM	WNUM1	REF	SH
X1	1	21	2-B	2
X1	2	22	2-B	2
X1	3	23	2-B	2
X1	4	210	2-E	2
X1	5	211	2-E	2
X1	6	212	2-E	2
X2	1	31	1-B	3
X2	2	32	2-B	3
X2	3	41	1-B	4
X2	4	43	1-B	4
X2	5	42	2-B	4
X2	6	44	3-B	4
X2	7	45	3-B	4
X2	8	217	1-D	2
X2	9	218	1-D	2
X2	10	46	4-B	4
X2	11	48	4-B	4
X2	12	47	5-B	4
X2	13	49	6-B	4
X2	14	412	6-B	4
X2	15	410	7-B	4
X2	16	34A	3-B	3
X2	17	35	3-C	3
X2	18	38	4-B	3
X2	19	312	4-C	3
X2	20	311	5-E	3
X2	21	318	5-E	3
X2	22	413	1-E	4
X2	23	414	2-E	4
X2	24	415	2-E	4
X2	25	416	2-E	4
X2	26	310	4-C	4
X2	27	311	4-D	4
X2	28	221	1-F	4
X2	29	220	1-F	4
X2	30	213	5-A	4
X2	31	214	5-A	4
X2	32	215	5-B	4
X2	33	216	5-B	4



NUMERICAL RELAY

[illegible]

** - FOR RATING KINDLY REFER RESPECTIVE BOARD SLD



1			2			3			4			5			6			7		
SL. NO	SYMBOL	LEGEND & DESCRIPTION	SL. NO	SYMBOL	LEGEND & DESCRIPTION															
01.		"K" POWER/AUX. CONTACTOR "VAG" VOLTAGE RELAY	18.		"T" OFF DELAY TIMER															
02.		"A" AMMETER	19.		"CT" CURRENT TRANSFORMER															
03.		"V" VOLTMETER	20.		"PT" POTENTIAL TRANSFORMER															
04.		"CTD" CURRENT TRANSDUCER	21.		"CST" CONTROL SUPPLY TRANSFORMER															
05.		"VTD" VOLTAGE TRANSDUCER	22.		"VSS" VOLTAGE SELECTOR SWITCH															
06.		"SH" DC SHUNT	23.		"ASS" AMMETER SELECTOR SWITCH															
07.		"CB" CIRCUIT BREAKER	24.		"OLR" OVER LOAD RELAY															
08.		"FSU" FUSE SWITCH UNIT	25.		"PB" NO PUSH BOTTON															
09.		"F" FUSE	26.		"PB" NC PUSH BOTTON															
10.		"SS" CONTROL SWITCH	27.		"NL" NEUTRAL LINK															
11.		"H" INDICATION LAMP	28.		"X" CONTACT IN BOTH SERVICE & TEST POSITION CONTACT IN TEST POSITION ONLY CONTACT IN SERVICE POSITION ONLY TERMINAL BLOCK															
12.		"NR" NUMERICAL RELAY INTERNAL COIL																		
13.		"T" ON DELAY TIMER																		
14.		"ACB" ACB SPRING CHARGE MOTOR	29.		"ACB" ACB NO, NC CONTACT															
15.		"ACB" ACB COIL	30.		SOURCE ARROW DESIGNATION ARROW															
16.		"MFM" MULTIFUNCTION METER	31.		"CTTB" CT TERMINAL BLOCK															
17.		"M" MOTOR	32.		"NR" NUMERICAL RELAY															

A) COMPONENT CROSS REFERENCE BETWEEN TWO SHEETS

01)
'D' INDICATES Y-AXIS ZONE
'4' INDICATES X-AXIS ZONE
'4' INDICATES PAGE NUMBER

02)
'D' INDICATES Y-AXIS ZONE
'4' INDICATES X-AXIS ZONE
'5' INDICATES PAGE NUMBER

B) COMPONENT CROSS REFERENCE OF SAME PAGE

01)
'B' INDICATES Y-AXIS ZONE
'6' INDICATES X-AXIS ZONE

02)
'B' INDICATES Y-AXIS ZONE
'7' INDICATES X-AXIS ZONE

C) COMPONENT NUMBERING EXAMPLE

01)
'1' INDICATES SERIAL NUMBER OF COMPONENT ON THAT PAGE
'4' INDICATES PAGE NUMBER
'MCB' INDICATES COMPONENTS NAME

02)
'1' INDICATES SERIAL NUMBER OF COMPONENT ON THAT PAGE
'4' INDICATES PAGE NUMBER
'FSU' INDICATES COMPONENTS NAME

D) FERRULE NUMBERING EXAMPLE

01)
'1' INDICATES SERIAL NUMBERS ON THAT PAGE
'2' INDICATES PAGE NUMBER ON THAT PAGES

02)
'11' INDICATES SERIAL NUMBERS ON THAT PAGE
'2' INDICATES PAGE NUMBER ON THAT PAGES

A) COMPONENT CROSS REFERENCE BETWEEN TWO SHEETS

- 01)
- 'D' INDICATES Y-AXIS ZONE
'4' INDICATES X-AXIS ZONE
'4' INDICATES PAGE NUMBER
- 02)
- 'D' INDICATES Y-AXIS ZONE
'4' INDICATES X-AXIS ZONE
'5' INDICATES PAGE NUMBER

B) COMPONENT CROSS REFERENCE OF SAME PAGE

- 01)
- 'B' INDICATES Y-AXIS ZONE
'6' INDICATES X-AXIS ZONE
- 02)
- 'B' INDICATES Y-AXIS ZONE
'7' INDICATES X-AXIS ZONE

C) COMPONENT NUMBERING EXAMPLE

- 01)
- '1' INDICATES SERIAL NUMBER OF COMPONENT ON THAT PAGE
'4' INDICATES PAGE NUMBER
'MCB' INDICATES COMPONENTS NAME
- 02)
- '1' INDICATES SERIAL NUMBER OF COMPONENT ON THAT PAGE
'4' INDICATES PAGE NUMBER
'FSU' INDICATES COMPONENTS NAME

D) FERRULE NUMBERING EXAMPLE

- 01)
- '1' INDICATES SERIAL NUMBERS ON THAT PAGE
'2' INDICATES PAGE NUMBER ON THAT PAGES
- 02)
- '11' INDICATES SERIAL NUMBERS ON THAT PAGE
'2' INDICATES PAGE NUMBER ON THAT PAGES

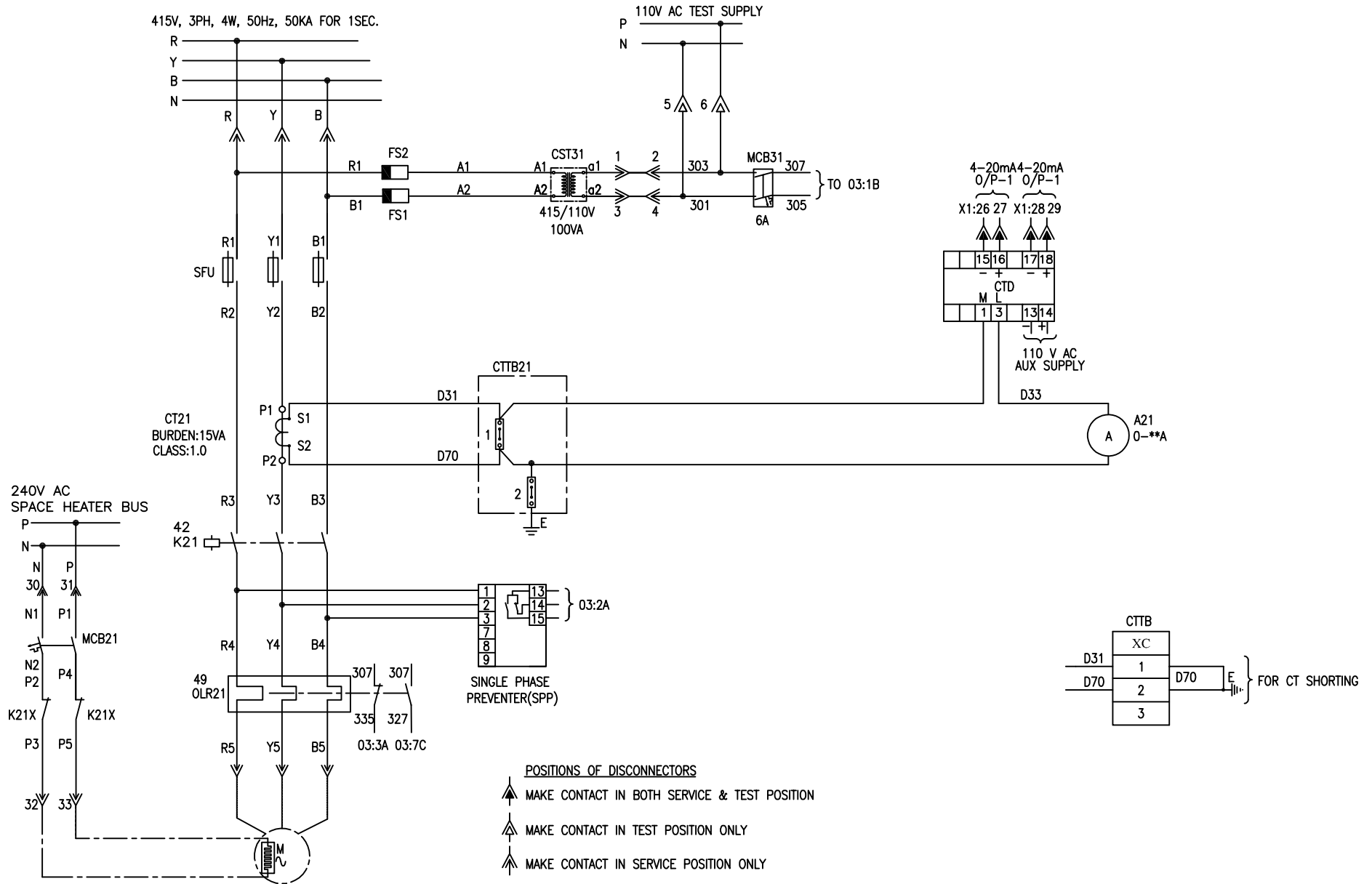
					NAME	DATE	CONSULTANT:- DCPL, NAVI MUMBAI		CONTRACTOR:- BHARAT HEAVY ELECTRICALS LTD. UNIT: SOLAR BUSINESS DIVISION; BENGALURU				
			DESIGNED	PRAKASH	29.04.21	PROJECTION	PYROTECH ELECTRONICS PVT.LTD. UNIT#4, UDAIPUR 313003			DRAWING No.	EP-4-CS-18001-030	REV.	01
			CHECKED	JYPAL	29.04.21		PROJECT:- 1X660MW BHUSAWAL THERMAL POWER STATION; UNIT-6					SHEET NO	7
01	22.06.21	AS PER DCPL/MAHAGENCO COMMENTS		APPROED	JYPAL		29.04.21	CUSTOMER:- MAHARASHTRA STATE POWER GENERATION CO. LTD.					NO.OF SHEET
REV	DATE	DESCRIPTION		SCALE: NTS	PROJ.No: 37669	BHEL PO No. 4500032596; DTD: 12.11.2020	DRG. TITLE:-	SCHEME FOR DOL MOTOR FEEDER 75KW & ABOVE BUT LESS THAN 90KW					

	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)					
	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA					
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.		DEPT. CODE M		NAME	SIGN	DATE
			DESIGN	DJ		19/06/21
			CHECKED	DP		19/06/21
			APPROVED	PSP		19/06/21
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-034	
02						
01					NO. OF SHEET. 05	REV. 00
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW WITH REACCELERATION (DK21E)	

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

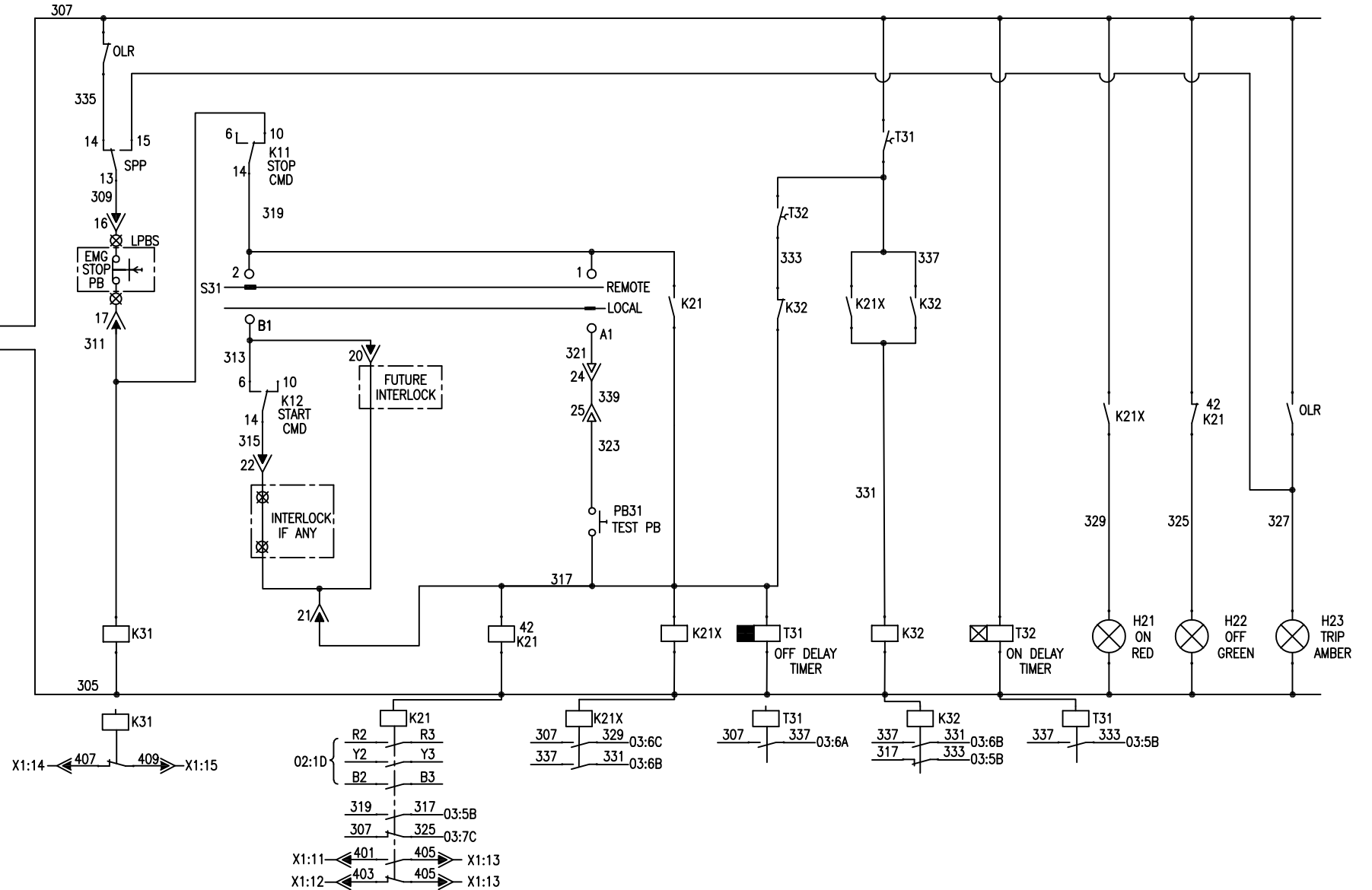
DRG. NO. EP-4-CS-012-034



INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE		
	3				DESIGNED	DJ	19.06.21	TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW WITH REACCELERATION (DK21E)	NO. OF SHEETS		05		
	2				DRAWN				SHEET. NO.		02		
	1				CHECKED	DP	19.06.21						
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-034	REV. 00

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



NOTE: TEST PB WILL BE ACCESSIBLE ONLY WHEN DOOR IS OPEN

INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW WITH REACCELERATION (DK21E)	NO. OF SHEETS	05		
	2					DRAWN						SHEET. NO.	03		
	1					CHECKED	DP		19.06.21						
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012



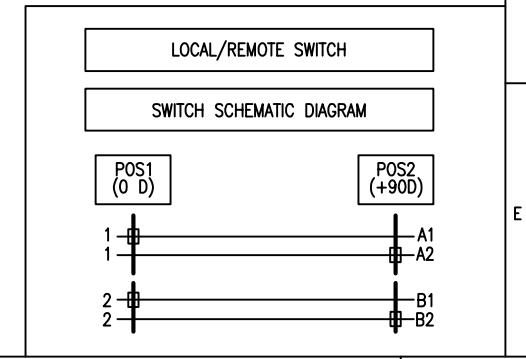
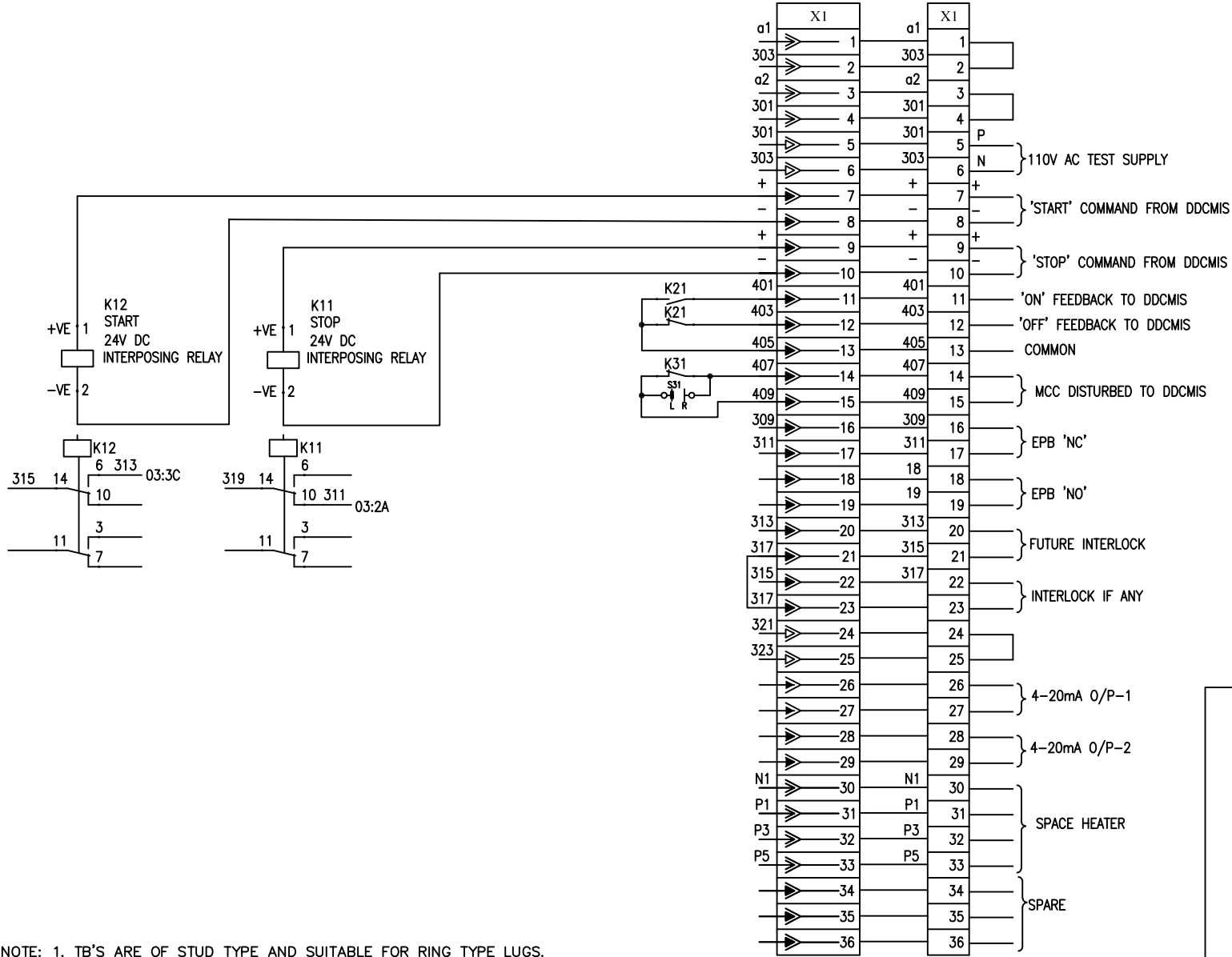
TITLE : POWER & CONTROL SCHEME
 FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW
 WITH REACCELERATION (DK21E)

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-034
DRG. NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



NOTE: 1. TB'S ARE OF STUD TYPE AND SUITABLE FOR RING TYPE LUGS.

INVENTORY NO.					NAME	SIGN.	DATE			BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE			
	4						19.06.21						
	3				DESIGNED	DJ							
	2				DRAWN								
	1				CHECKED	DP	19.06.21	SCALE: NA		JOB NO. CP-012		DRG. NO. EP-4-CS-012-034	
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED					NO. OF SHEETS	05
							PSP			POWER & CONTROL SCHEME FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW WITH REACCELERATION (DK21E)		SHEET. NO.	04
												REV.	00

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-034
DRG. NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

6

7

8

BILL OF MATERIAL FOR EP-4-CS-012-034

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	OVER LOAD RELAY WITH 1NO+1NC CONTACT	C&S ELECTRIC	1
4	***A POWER CONTACTOR WITH 2NO+2NC CONTACTS & COIL VOLTAGE IS 110V AC	C&S ELECTRIC	1
5	AUX CONTACTOR WITH 2NO+2NC 110V AC	C&S ELECTRIC	2
6	SINGLE PHASE PREVENTER(SPP)	CUSTOMER APPROVED	1
7	MCB DP 6A AC	EATON	1
8	415/110V CST 100VA	PRAGATI	1
9	FUSE 2A	L&T	2
10	FUSE BASE 32A	L&T	2
11	2POLE 2WAY SWITCH 10A 110V AC LOCKABLE(SPA5216BB6/TB3/W)	RECOM	1
12	CURRENT TRANSDUCER	SECURE	1
13	OFF DELAY TIMER	L&T	1
14	ON DELAY TIMER	L&T	1
15	INTERPOSING RELAY	JYOTI	2
16	AC AMMETER (0-***A)	RISHABH	1
17	INDICATING LAMP RED 110V AC	CUSTOMER APPROVED	1
18	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
19	INDICATING LAMP AMBER 110V AC	CUSTOMER APPROVED	1
20	PUSH BUTTON BLACK 110V AC	CUSTOMER APPROVED	1
21	CT TERMINAL BLOCK 4SQ.MM		3
22	TERMINAL BLOCK 4SQ.MM		36

INVENTORY NO.

4						NAME	SIGN.	DATE
3					DESIGNED	DJ		19.06.21
2					DRAWN			
1					CHECKED	DP		19.06.21
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR UNIDIRECTIONAL MOTOR FEEDER 30KW & ABOVE UPTO 75KW
WITH REACCELERATION (DK21E)



NO. OF SHEETS 05
SHEET. NO. 05

SCALE: NA JOB NO. CP-012 DRG. NO. EP-4-CS-012-034

REV. 00

	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)				
	TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA				
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M	NAME DESIGN CHECKED APPROVED	DJ DP PSP
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-035
02					
01	REVISED AS PER CUSTOMER COMMENTS	DJ	26.07.21		
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR BIDIRECTIONAL MOTOR FEEDER (DN1)

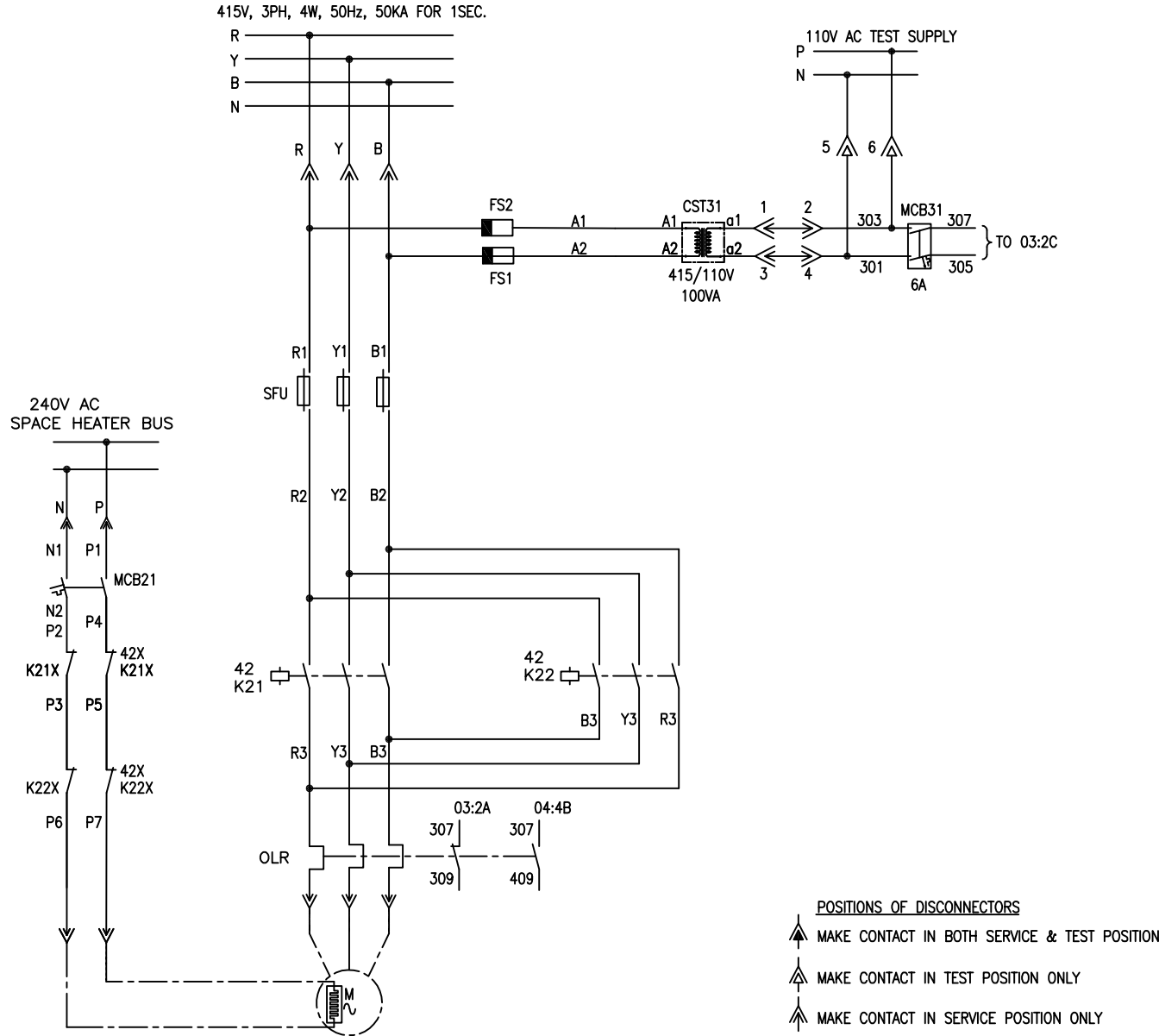
TATA CONSULTING ENGINEERS LIMITED
VENDOR DOCUMENT REVIEW STATUS
☒ A Drawing/Document approved as submitted.
 Proceed with fabrication/construction.
☐ B Drawing/Document approved subjected to
 comments noted. Proceed with fabrication/
 construction considering the comments.
☐ C Our comments are noted on this marked up
 print.
☐ D Our comments are noted and are not attached to
 the forwarding transmittal letter No.
 Date: 12/08/2021
☐ E Correct original of this drawing/document to
 reflect our comments and resubmit for approval.
☐ F Correct original of this drawing/document to
 reflect our comments and resubmit for records.
☐ G Drawings/Documents of this category are for
 information only and not for approval.
 Information furnished on the drawing/document
 is noted.
☒ H Drawing/Document reviewed against our
 previous comments and other revisions
 highlighted and identified by the vendor.
☐ I Drawing/Document returned without review.
☐ J Print not enclosed.
 Approval conveyed herein neither relieves the
 Vendor/Contractor of his contractual obligations and
 his responsibilities for correctness of dimensions,
 materials of construction, weights, quantities, design
 details, assembly fits, performance requirements and
 conformity of the supplies with the Indian Statutory
 Laws as may be applicable, nor does it limit the
 purchaser's rights under the contract.
 Reviewed by: Date: 12/08/2021

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-035

FIRST ANGLE PROJECTION

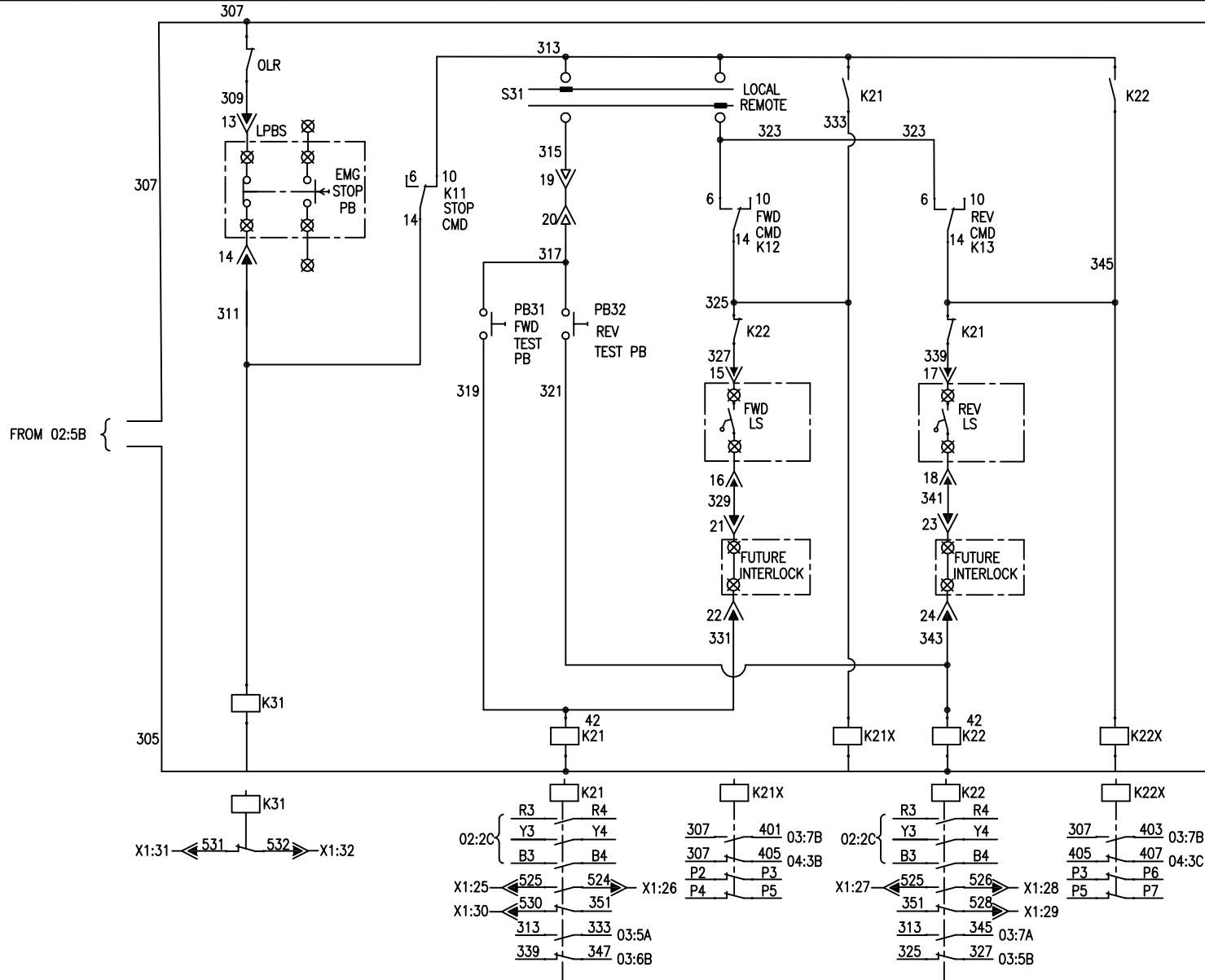
ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	4					NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE							
	3					DESIGNED	DJ	19.06.21									
	2					DRAWN											
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS			DJ	DJ	CHECKED		DP	19.06.21	TITLE : POWER & CONTROL SCHEME FOR BIDIRECTIONAL MOTOR FEEDER (DN1)			NO. OF SHEETS	06	
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED		PSP	19.06.21				SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-035

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



NOTE:-
 TEST PB WILL BE ACCESSIBLE ONLY WHEN DOOR IS OPEN

INVENTORY NO.	4					NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3				DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR BIDIRECTIONAL MOTOR FEEDER (DN1)	NO. OF SHEETS	06		
	2				DRAWN						SHEET. NO.	03		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS		DJ	DJ	CHECKED	DP			19.06.21			
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-035

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-035

INVENTORY NO.	4							NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3						DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR BIDIRECTIONAL MOTOR FEEDER (DN1)	NO. OF SHEETS	06		
	2						DRAWN						SHEET. NO.	04		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS			DJ	DJ	CHECKED	DP				19.06.21			
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-035

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-035

INVENTORY NO.	4							NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3						DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR BIDIRECTIONAL MOTOR FEEDER (DN1)	NO. OF SHEETS	06		
	2						DRAWN						SHEET. NO.	04		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS			DJ	DJ	CHECKED	DP				19.06.21			
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-035

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-035

INVENTORY NO.	4							NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3						DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR BIDIRECTIONAL MOTOR FEEDER (DN1)	NO. OF SHEETS	06		
	2						DRAWN						SHEET. NO.	04		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS			DJ	DJ	CHECKED	DP				19.06.21			
	REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-035

COPYRIGHT AND CONFIDENTIAL

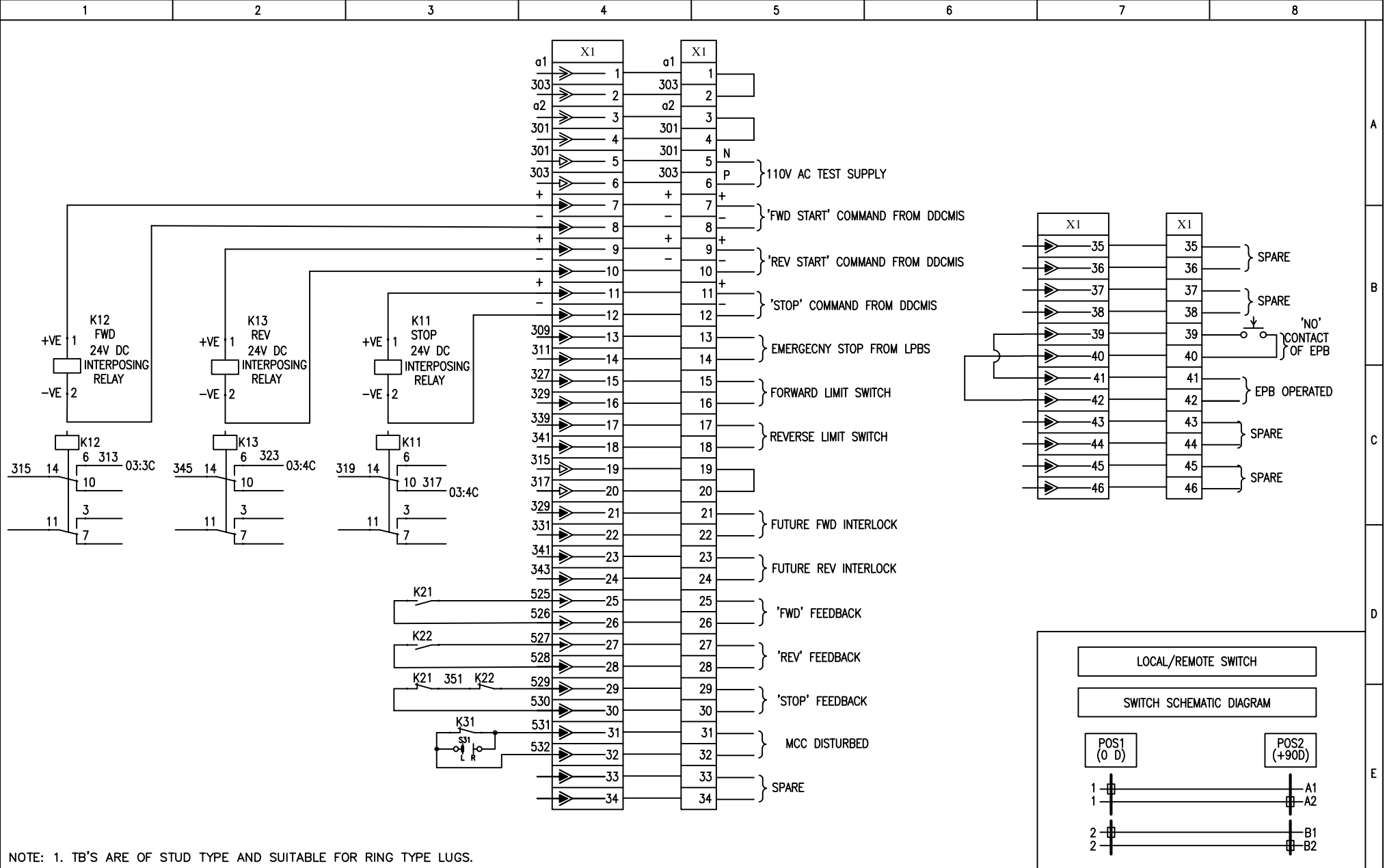
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-035

DRG. NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



NOTE: 1. TB'S ARE OF STUD TYPE AND SUITABLE FOR RING TYPE LUGS.

INVENTORY NO.	4					NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3				DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR BIDIRECTIONAL MOTOR FEEDER (DN1)	NO. OF SHEETS	06		
	2				DRAWN						SHEET. NO.	05		
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS		DJ	DJ	CHECKED	DP			19.06.21			
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP				19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-035

TITLE :

POWER & CONTROL SCHEME
FOR BIDIRECTIONAL MOTOR FEEDER (DN1)

NO. OF SHEETS 06
SHEET. NO. 05

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company

EP-4-CS-012-035
DRG. NO.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

6

7

8

BILL OF MATERIAL FOR EP-4-CS-012-035

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	OVER LOAD RELAY WITH 1NO+1NC CONTACT	C&S ELECTRIC	1
4	***A POWER CONTACTOR WITH 2NO+2NC CONTACTS & COIL VOLTAGE IS 110V AC	C&S ELECTRIC	2
5	AUX CONTACTOR WITH 2NO+2NC 110V AC	C&S ELECTRIC	4
6	MCB DP 6A AC	EATON	1
7	415/110V CST 100VA	PRAGATI	1
8	FUSE 2A	L&T	2
9	FUSE BASE 32A	L&T	2
10	2POLE 2WAY SWITCH 10A 110V AC LOCKABLE(SPA5216BB6/TB3/W)	RECOM	1
11	IINTERPOSING RELAY	JYOTI	3
12	INDICATING LAMP RED 110V AC	CUSTOMER APPROVED	2
13	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
14	INDICATING LAMP AMBER 110V AC	CUSTOMER APPROVED	1
15	PUSH BUTTON BLACK 110V AC	CUSTOMER APPROVED	1
16	POWER TERMINAL BLOCK 4SQ.MM		46

A

B

C

D

E

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		19.06.21
	2					DRAWN			
	1					CHECKED	DP		19.06.21
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR BIDIRECTIONAL MOTOR FEEDER (DN1)

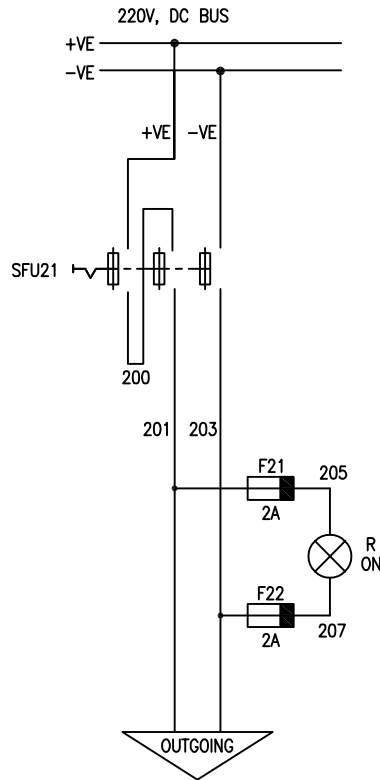


NO. OF SHEETS	06
SHEET. NO.	06

JOB NO. CP-012	DRG. NO. EP-4-CS-012-035	REV. 01
----------------	--------------------------	---------

#APPLICABLE FOR 220V MAIN DCDB(1FA, 2FA, 3FA, 4FA & 5FA), 220V DCDB (SWITCHYARD) AND SUB DCDB'S

 CUSTOMER		TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)							
 CONSULTANT		TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA							
 भारत भारी लिमिटेड BHEL		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE							
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M			☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.	NAME _____	SIGN _____	DATE _____
				DESIGN			☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor.		19/06/21
				CHECKED			☐ I Drawing/Document returned without review. ☐ PSF not enclosed.		19/06/21
				APPROVED			Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.		
03		DEPT.	DATE	SIGN	DRAWING NO. EP-4-CS-012-024 Reviewed by..... <i>Harika</i>Date.....22/09/2021				
02	REVISED AS PER CUSTOMER COMMENTS	DJ	13.09.21						
01									
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR DC OUTGOING (X)				



BILL OF MATERIAL FOR EP-4-CS-012-024

SL NO.	DESCRIPTION	MAKE	QTY
1	*SWITCH FUSE UNIT AC23	C&S ELECTRIC	1
2	SFU FUSE 80kA FOR 1SEC	C&S ELECTRIC	2
3	FUSE BASE 32A	L&T	2
4	FUSE 2A 50kA	L&T	2
5	INDICATING LAMP RED 220V DC	C&S ELECTRIC/L&T(ESBEE)	1

SFU SELECTION CHART

		RATING AS PER MOM 09092021	
DC CURRENT RATING	2.5TIMES	AC FUSE #	AC SFU RATING
2A	5	6A	32A
4A	10	10A	32A
6A	15	16A	32A
10A	25	32A	32A
16A	40	63A	63A
20A	50	63A	63A
32A	80	100A	100A
40A	100	125A	125A
63A	157.5	160A	160A
100A	250	250A	250A
125A	312.5	320A	320A
160A	400	400A	400A
200A	500	500A	500A
250A	625	630A	630A
300A	750	800A MDO ACB	
400A	1000	1000A MDO ACB	
630A	1575	1600A MDO ACB	
1000A	2500	2500A MDO ACB	
1250A	3125	3200A MDO ACB	
1600A	4000	4000A MDO ACB	

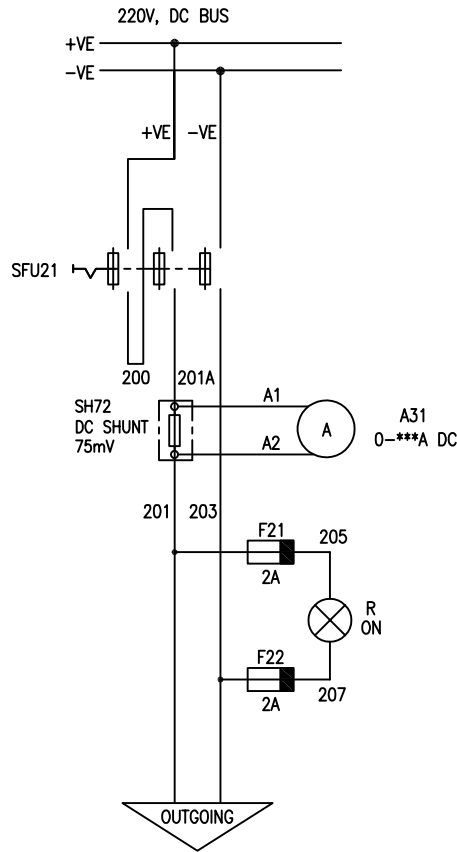
#-FUSE FAULT LEVEL SHALL BE MINIMUM 80KA AC RATING

NOTE:-

* WILL BE 2.5 TIMES DC CURRENT RATING

INVENTORY NO.	4					NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
	3					DESIGNED	DJ	19.06.21						
	2	13.09.21	REVISED AS PER CUSTOMER COMMENTS		DJ	DJ	DRAWN				TITLE : POWER & CONTROL SCHEME FOR DC OUTGOING (X)	NO. OF SHEETS		03
	1						CHECKED	DP		19.06.21		SHEET. NO.		02
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	19.06.21	SCALE: NA	JOB NO. CP-012	DRG. NO. EP-4-CS-012-024	REV. 02	

BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE			
TITLE : POWER & CONTROL SCHEME FOR DC OUTGOING (X)		NO. OF SHEETS	03
		SHEET. NO.	02
JOB NO. CP-012		DRG. NO. EP-4-CS-012-024	
		REV. 02	



BILL OF MATERIAL FOR EP-4-CS-012-024

SL NO.	DESCRIPTION	MAKE	QTY
1	*SWITCH FUSE UNIT AC23	C&S ELECTRIC	1
2	SFU FUSE 80kA FOR 1SEC	C&S ELECTRIC	2
3	FUSE BASE 32A	L&T	2
4	FUSE 2A 50kA	L&T	2
5	DC AMMETER (0-***A)	RISHABH	1
6	DC SHUNT 75MV	RISHABH	1
7	INDICATING LAMP RED 220V DC	C&S ELECTRIC/L&T(ESBEE)	1

SFU SELECTION CHART

		RATING AS PER MOM 09092021	
DC CURRENT RATING	2.5TIMES	AC FUSE #	AC SFU RATING
2A	5	6A	32A
4A	10	10A	32A
6A	15	16A	32A
10A	25	32A	32A
16A	40	63A	63A
20A	50	63A	63A
32A	80	100A	100A
40A	100	125A	125A
63A	157.5	160A	160A
100A	250	250A	250A
125A	312.5	320A	320A
160A	400	400A	400A
200A	500	500A	500A
250A	625	630A	630A
300A	750	800A MDO ACB	
400A	1000	1000A MDO ACB	
630A	1575	1600A MDO ACB	
1000A	2500	2500A MDO ACB	
1250A	3125	3200A MDO ACB	
1600A	4000	4000A MDO ACB	

NOTE:-

#-FUSE FAULT LEVEL SHALL BE MINIMUM 80KA AC RATING

THIS SCHEME IS APPLICABLE FOR DC MOTOR FEEDERS AND CRITICAL FEEDERS, WHICH WILL BE INDICATED IN SLD OF RESPECTIVE SWITCHBOARD

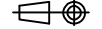
INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP	NAME	SIGN.	DATE
4									
3					DESIGNED	DJ			19.06.21
2	13.09.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	DRAWN				
1					CHECKED	DP			19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR DC OUTGOING (X)



NO. OF SHEETS 03
SHEET. NO. 03

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-024

REV. 02

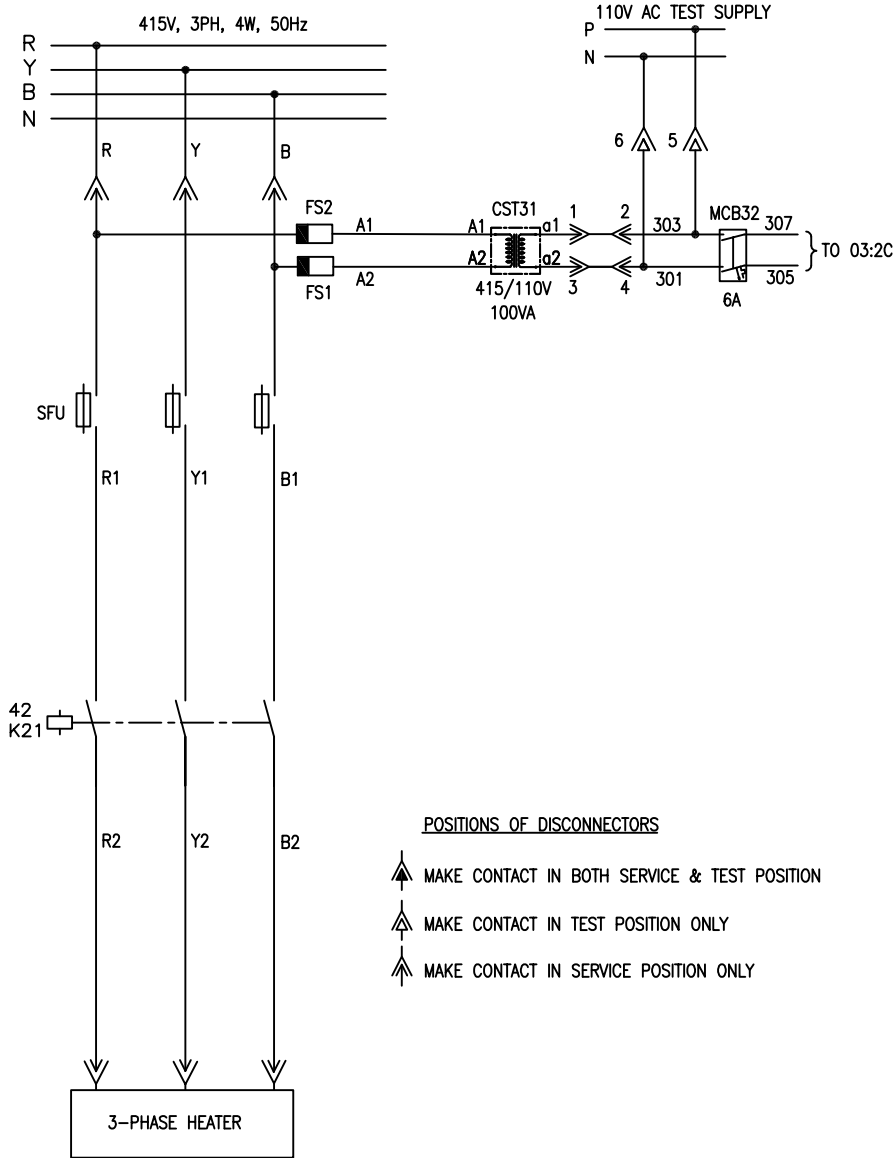
	CUSTOMER TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA INDIA YADADRI TPS(5X800MW)				
	CONSULTANT TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA				
	BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.			DEPT. CODE M	NAME DESIGN DJ CHECKED DP APPROVED PSP	TATA CONSULTING ENGINEERS LIMITED VENDOR DOCUMENT REVIEW STATUS ☐ A Drawing/Document approved as submitted. ☒ B Drawing/Document approved subject to comments noted. Proceed with fabrication/ construction considering our comments. ☐ C Our comments are noted on this marked on print. ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. ☒ E Correct original of this drawing/document to reflect our comments and resubmit for approval. ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records. ☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted. ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor. ☐ I Drawing/Document returned without review. ☐ J Print not enclosed. Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract. Reviewed by: _____ Date: 12/08/2021
03		NAME	DATE	SIGN	DRAWING NO. EP-4-CS-012-036 NO. OF SHEET. 05
02					
01	REVISED AS PER CUSTOMER COMMENTS	DJ	26.07.21		
REV HISTORY	DESCRIPTION			SCALE	TITLE: SCHEME FOR 3-PHASE CONTACTOR CONTROLLED FEEDER (EA3)

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-036

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



POSITIONS OF DISCONNECTORS

- MAKE CONTACT IN BOTH SERVICE & TEST POSITION
- MAKE CONTACT IN TEST POSITION ONLY
- MAKE CONTACT IN SERVICE POSITION ONLY

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		19.06.21
	2					DRAWN			
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP		19.06.21
REV. NO.	DATE	DESCRIPTION			BY	APPD.	APPROVED	PSP	19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR 3-PHASE CONTACTOR CONTROLLED FEEDER (EA3)



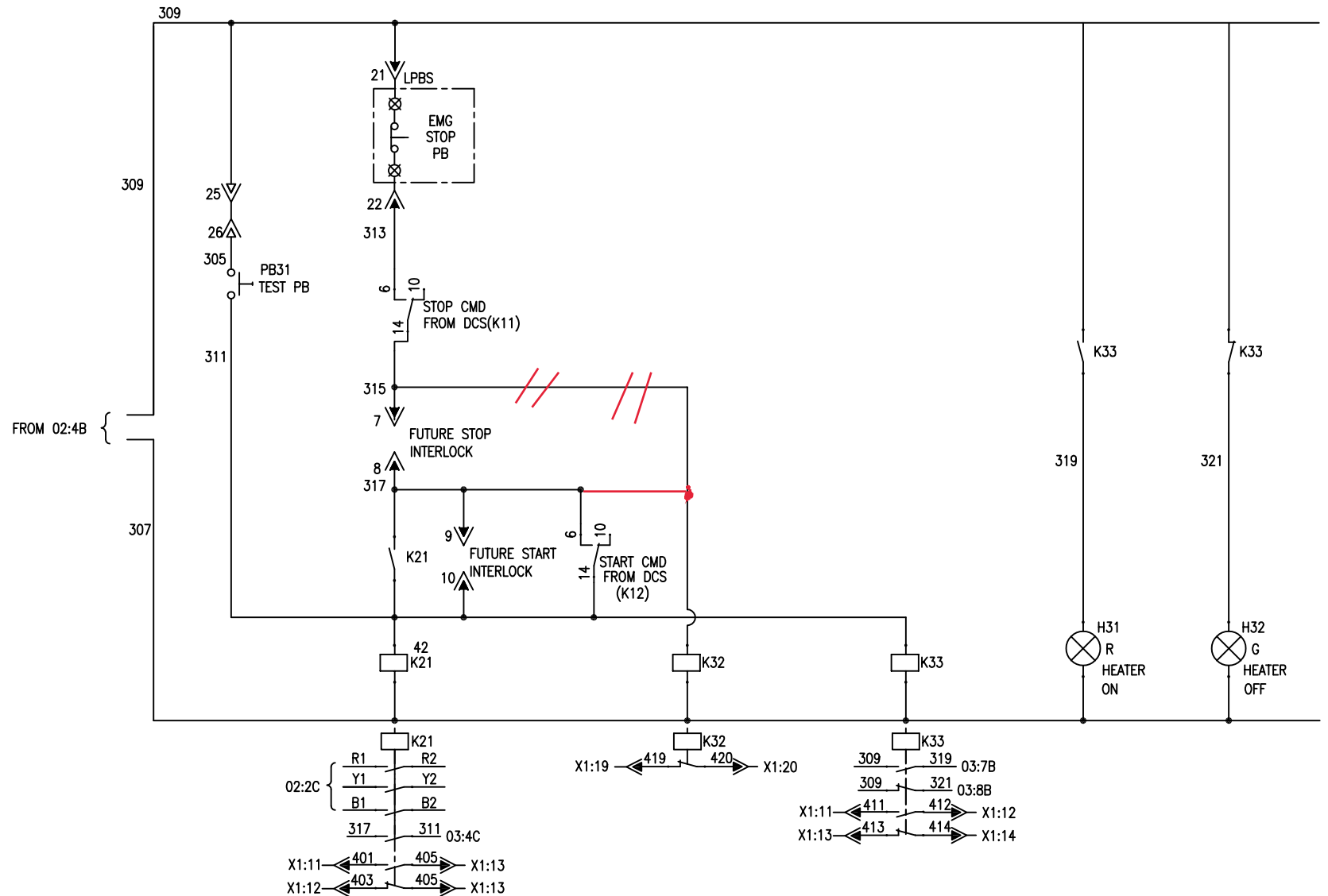
NO. OF SHEETS 05
SHEET. NO. 02

SCALE: NA JOB NO. CP-012 DRG. NO. EP-4-CS-012-036 REV. 01

COPYRIGHT AND CONFIDENTIAL

The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DRG. NO. EP-4-CS-012-036



NOTE: TEST PB WILL BE ACCESSIBLE ONLY WHEN DOOR IS OPEN

INVENTORY NO.	4						NAME	SIGN.	DATE
	3					DESIGNED	DJ		19.06.21
	2					DRAWN			
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP		19.06.21
	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR 3-PHASE CONTACTOR CONTROLLED FEEDER (EA3)



NO. OF SHEETS	05
SHEET. NO.	03

REV.	01
------	----

JOB NO. CP-012

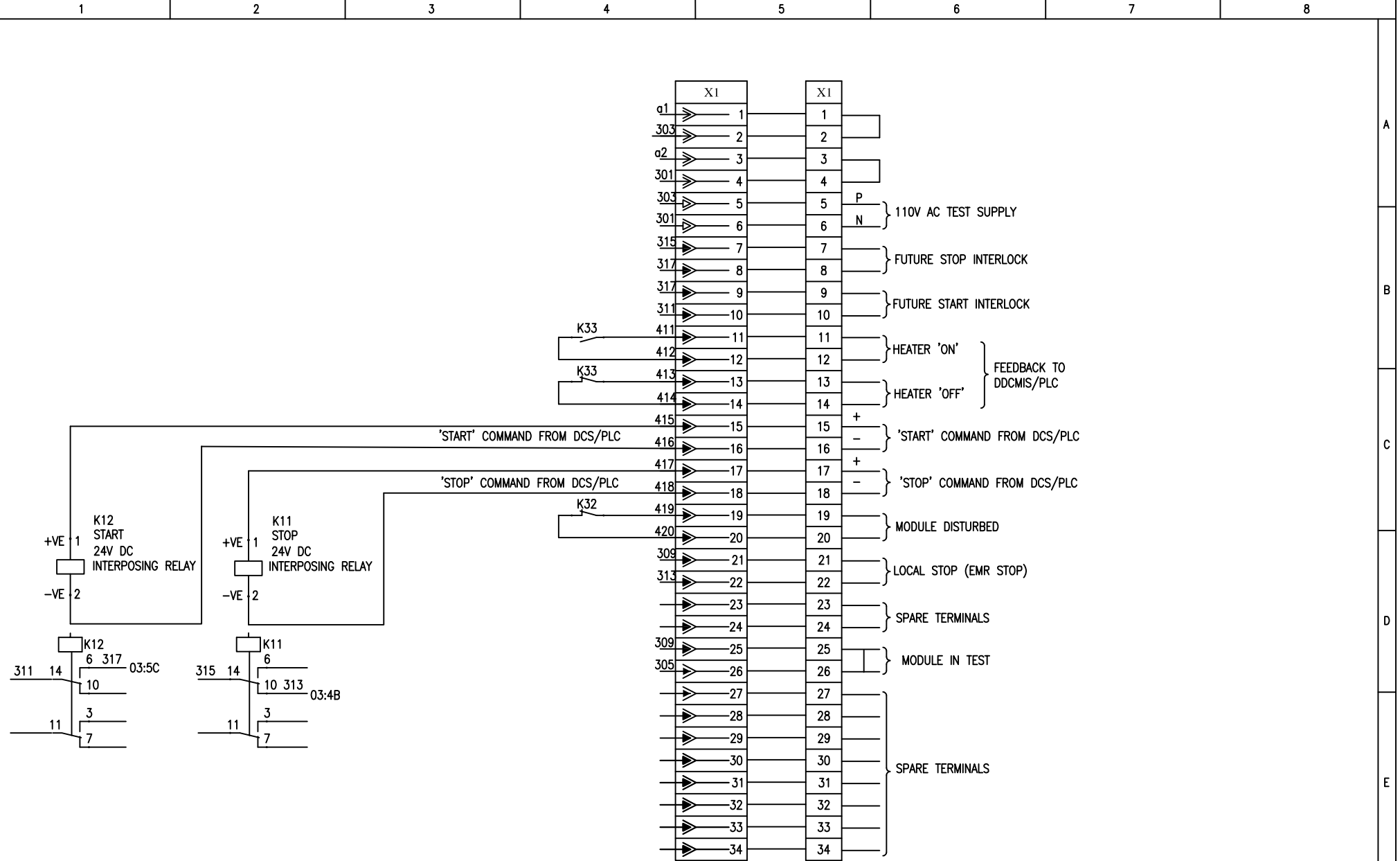
DRG. NO. EP-4-CS-012-036

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-036

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



NOTE: 1. TB'S ARE OF STUD TYPE AND SUITABLE FOR RING TYPE LUGS.

INVENTORY NO.	4						NAME	SIGN.	DATE		BHARAT HEAVY ELECTRICALS LIMITED SOLAR BUSINESS DIVISION BANGALORE					
	3					DESIGNED	DJ		19.06.21		TITLE : POWER & CONTROL SCHEME FOR 3-PHASE CONTACTOR CONTROLLED FEEDER (EA3)	NO. OF SHEETS	05			
	2					DRAWN						SHEET. NO.	04			
	1	26.07.21	REVISED AS PER CUSTOMER COMMENTS			DJ	DJ	CHECKED	DP				19.06.21			
	REV. NO.	DATE	DESCRIPTION				BY	APPD.	APPROVED			PSP			19.06.21	SCALE: NA

TITLE :		POWER & CONTROL SCHEME FOR 3-PHASE CONTACTOR CONTROLLED FEEDER (EA3)		NO. OF SHEETS	05
				SHEET. NO.	04

COPYRIGHT AND CONFIDENTIAL
The information on the document is the property of BHARAT HEAVY ELECTRICALS LIMITED
It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-4-CS-012-036

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

6

7

8

A

B

C

D

E

BILL OF MATERIAL FOR EP-4-CS-012-036

SL NO.	DESCRIPTION	MAKE	QTY
1	SWITCH FUSE UNIT ***A	C&S ELECTRIC	1
2	POWER FUSE ***A	C&S ELECTRIC	3
3	**A POWER CONTACTOR WITH 2NO+2NC CONTACTS & COIL VOLTAGE IS 110V AC	C&S ELECTRIC	1
4	AUX CONTACTOR WITH 2NO+2NC 110V AC	C&S ELECTRIC	2
5	MCB DP 6A AC	EATON	1
6	415/110V CST 100VA	PRAGATI	1
7	FUSE 2A	L&T	2
8	FUSE BASE 32A	L&T	2
9	INTERPOSING RELAY	JYOTI	2
10	INDICATING LAMP RED 110V AC	CUSTOMER APPROVED	1
11	INDICATING LAMP GREEN 110V AC	CUSTOMER APPROVED	1
12	PUSH BUTTON BLACK 110V AC	CUSTOMER APPROVED	1
13	TERMINAL BLOCK 4SQ.MM		34

INVENTORY NO.

4						NAME	SIGN.	DATE
3					DESIGNED	DJ		19.06.21
2					DRAWN			
1	26.07.21	REVISED AS PER CUSTOMER COMMENTS	DJ	DJ	CHECKED	DP		19.06.21
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	PSP		19.06.21



BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION BANGALORE

TITLE : POWER & CONTROL SCHEME
FOR 3-PHASE CONTACTOR CONTROLLED FEEDER (EA3)



NO. OF SHEETS	05
SHEET. NO.	05

SCALE: NA

JOB NO. CP-012

DRG. NO. EP-4-CS-012-036

REV. 01