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DRG. NO. EP-3-CS-048-022

FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM.


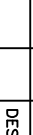
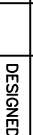

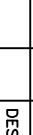
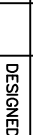



CUSTOMER:

TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:  
1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANT PVT LTD  
KOLKATA

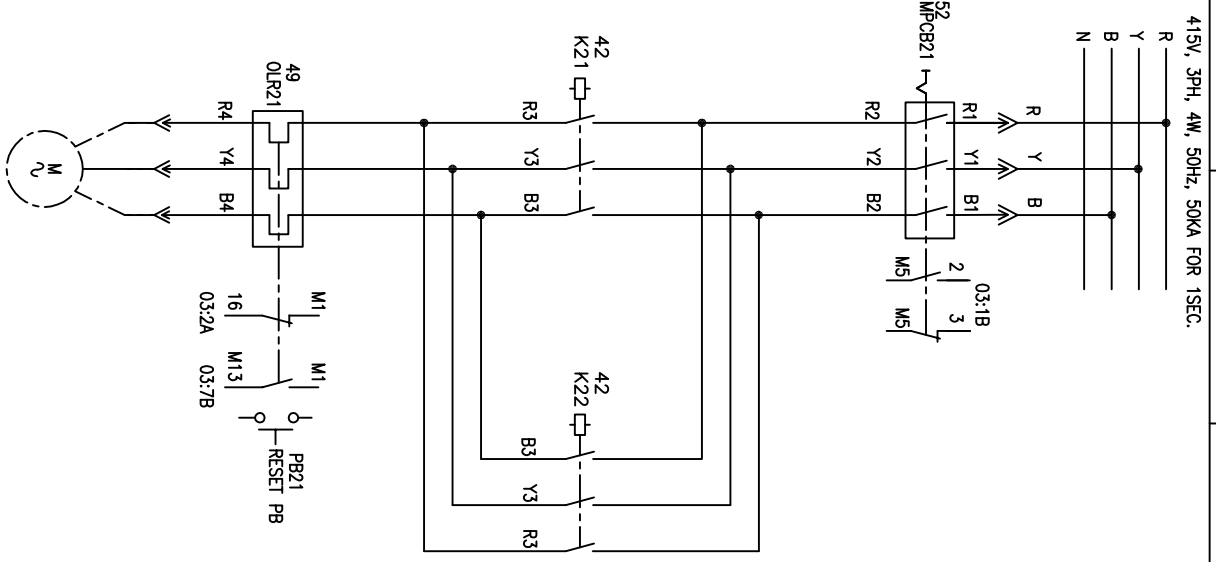
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4												06	02
3					DESIGNED	JAGADISH		22.05.15				06	
2	21.08.15	REVISED AS PER CUSTOMER COMMENTS LETTER REF NO. 0492, DT:12.08.15			DRAWN	JAGADISH		22.05.15				01	
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT:11.05.15			CHECKED	JAGADISH		22.05.15				01	



BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
BIDIRECTIONAL MOTOR FEEDER BELOW 30KW CONTROLLED FROM LOP(N1)

DRG. NO. EP-3-CS-048-022



POSITIONS OF DISCONNECTORS  
 ▲ MAKE CONTACT IN BOTH SERVICE & TEST POSITION  
 ▲ MAKE CONTACT IN TEST POSITION ONLY  
 ▲ MAKE CONTACT IN SERVICE POSITION ONLY

FIRST ANGLE PROJECTION  
 ALL DIMENSIONS ARE IN MM.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-022	NO. OF SHEETS	NO. OF SHEETS	REV.
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT:11.05.15			CHECKED	JAGADISH		22.05.15				06	02	02
2	21.08.15	REVISED AS PER CUSTOMER COMMENTS LETTER REF NO. 0492, DT:12.08.15			DRAWN	JAGADISH		22.05.15				06	02	02
3					DESIGNED	JAGADISH		22.05.15				06	02	02
4												06	02	02

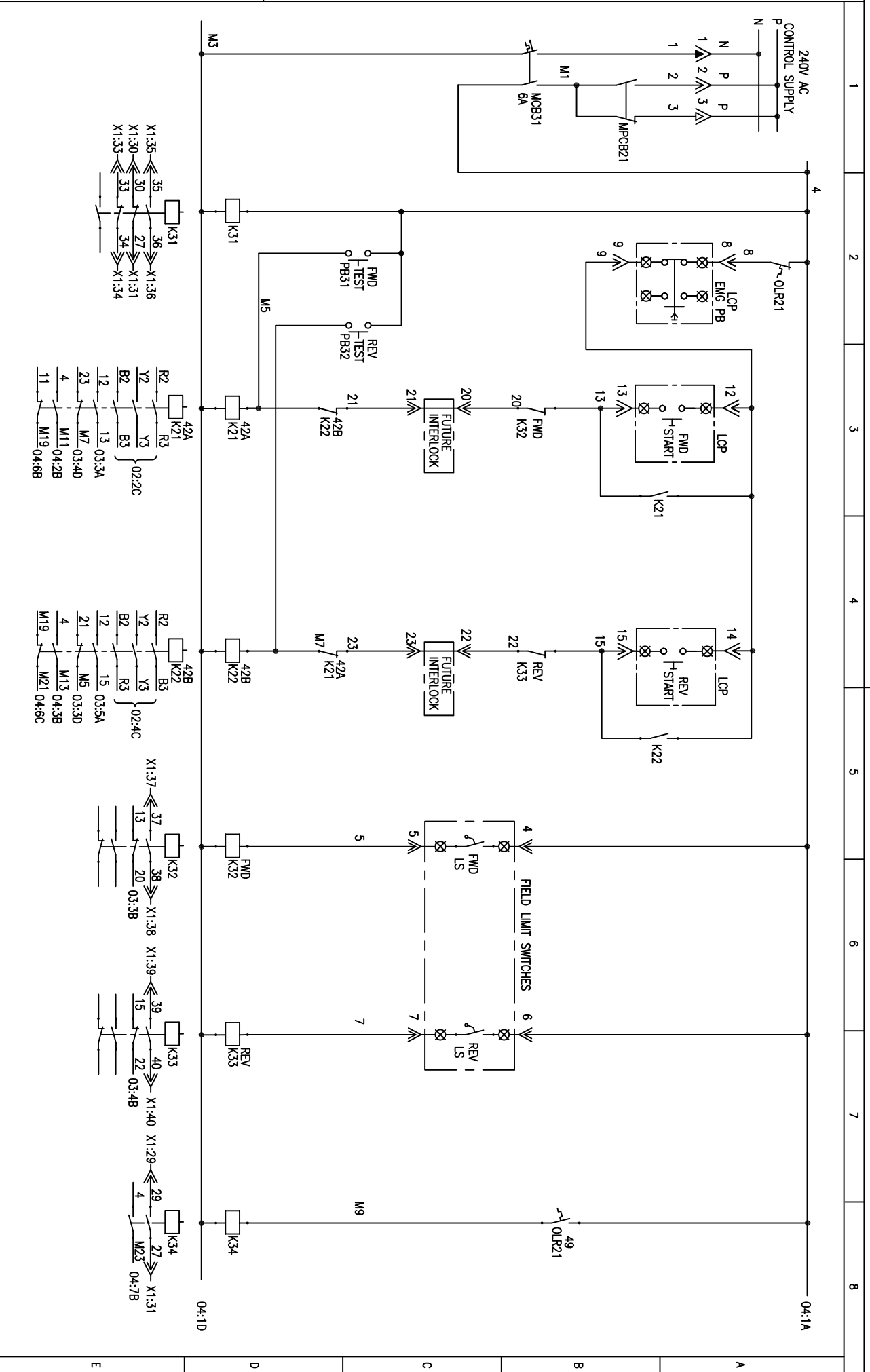
**BHARAT HEAVY ELECTRICALS LIMITED**  
 ELECTROPROTECTANS DIVISION BANGALORE



TITLE :  
 BIDIRECTIONAL MOTOR FEEDER BELOW 30KW CONTROLLED FROM LOP(N1)

DRG. NO. EP-3-CS-048-022

FORM 66-271 A3



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT:11.05.15			CHECKED	JAGADISH	22.05.15	CP-14-048	EP-3-CS-048-022	06	03	02
2	21.08.15	REVISED AS PER CUSTOMER COMMENTS LETTER REF NO. 0492, DT:12.08.15			DRAWN							
3					DESIGNED	JAGADISH	22.05.15					
4												

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERELANS DIVISION BANGALORE

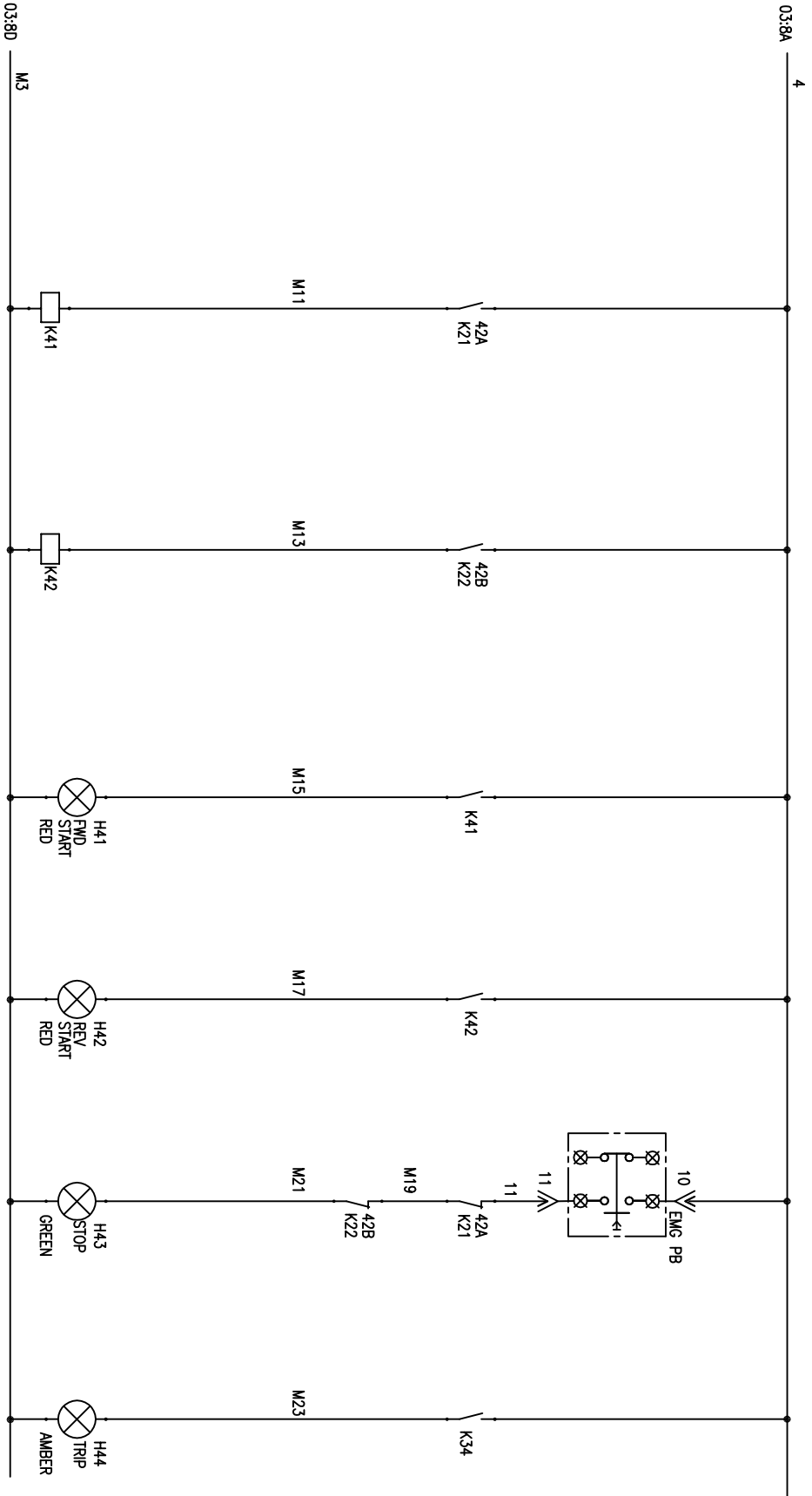


TITLE :  
POWER AND CONTROL SCHEME  
BIDIRECTIONAL MOTOR FEEDER BELOW 30KW CONTROLLED FROM LOP(N)

DRG. NO. EP-3-CS-048-022

FORM 66-271 A3

FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-022	NO. OF SHEETS	SHEET NO.	REV.
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2	21.08.15	REVISED AS PER CUSTOMER COMMENTS LETTER REF NO. 0492, DT:12.08.15			DRAWN	JAGADISH	22.05.15			06	04	02
3					DESIGNED	JAGADISH	22.05.15			06	04	02
4										06	04	02

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE



TITLE :  
POWER AND CONTROL SCHEME  
BIDIRECTIONAL MOTOR FEEDER BELOW 30KW CONTROLLED FROM LOP(N1)

NO. OF SHEETS	06
SHEET NO.	04
REV.	02

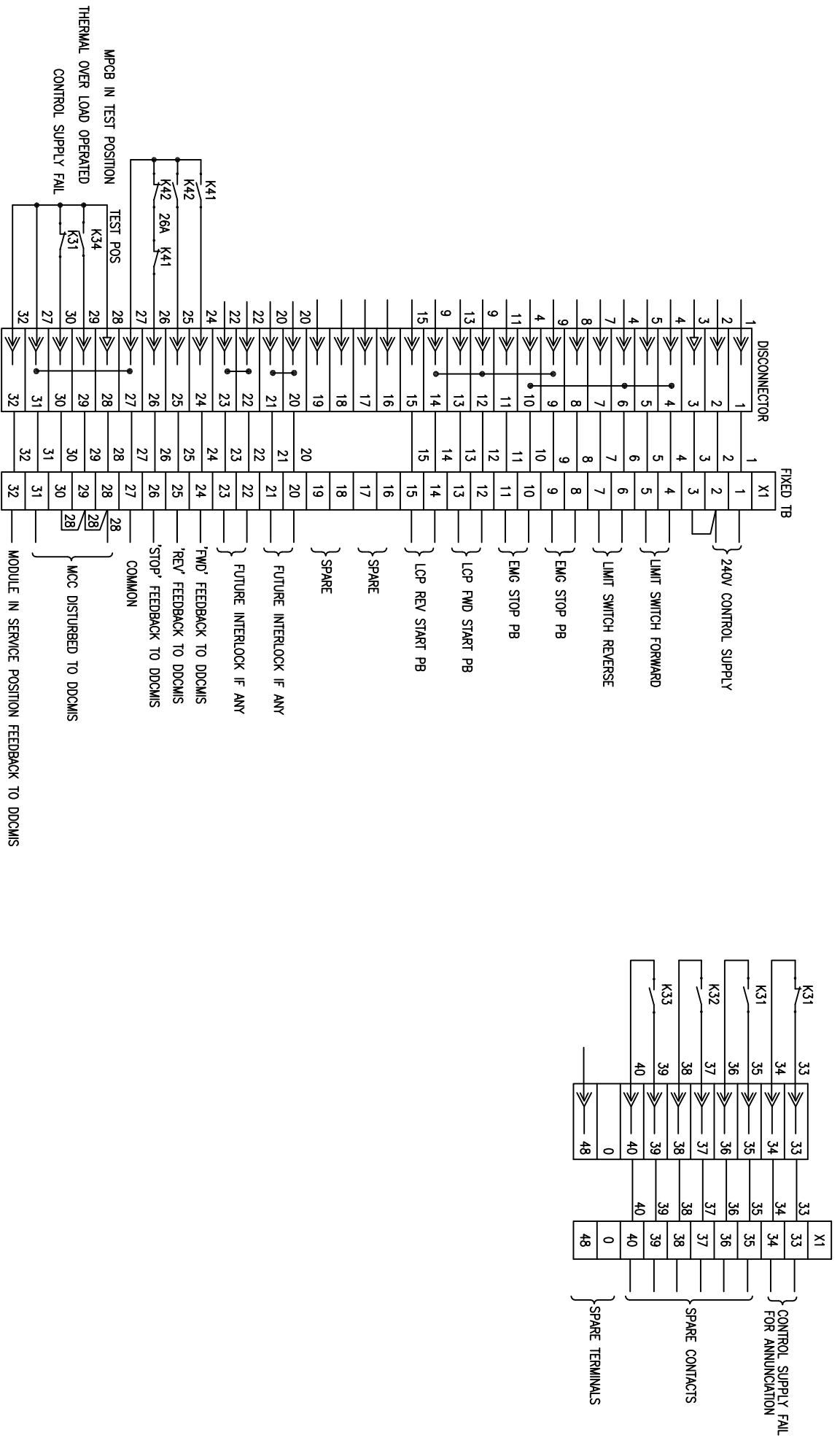
DRG. NO. EP-3-CS-048-022

FORM 66-271 A3

1 2 3 4 5 6 7 8

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-022	NO. OF SHEETS	SHEET NO.	REV.
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT:11.05.15			CHECKED	JAGADISH				06	05	02
2	21.08.15	REVISED AS PER CUSTOMER COMMENTS LETTER REF NO. 0492, DT:12.08.15			DRAWN	JAGADISH				06		
3					DESIGNED	JAGADISH						
4												

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTIVES DIVISION BANGALORE



TITLE :  
POWER AND CONTROL SCHEME  
BIDIRECTIONAL MOTOR FEEDER BELOW 30KW CONTROLLED FROM LCP(N1)



NO. OF SHEETS: 06  
SHEET: 05

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DRG. NO. EP-3-CS-048-022

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT	
		POWER CONTACTOR	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY	
		CURRENT TRANSFORMER	
		POTENTIAL TRANSFORMER	
		HRC FUSE	
		NEUTRAL LINK	
		BUSDUCT	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS
ACB	AIR CIRCUIT BREAKER
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
MPCB	MOTOR PROTECTION CB
FSU	FUSE SWITCH UNIT
IS	ISOLATOR
OLR	OVER LOAD RELAY
CT	CURRENT TRANSFORMER
PT	POTENTIAL TRANSFORMER
CTB	CT TESTING BOARD
F	FUSE
NL	NEUTRAL LINK
PS	POWER SOCKET
M	MOTOR
E	EARTHING
CST	CONTROL SUPPLY TRANSFORMER
A	AMMETER
V	VOLTMETER
ASS	AMMETER SELECTOR SWITCH
VSS	VOLTMETER SELECTOR SWITCH
W	WATT METER
WH	WATT HOUR METER
KWH	KILO WATT HOUR METER
PF	POWER FACTOR METER
MFM	MULTI FUNCTION METER
H	INDICATING LAMP
NR	NUMERICAL RELAY
SS	SELECTOR SWITCH
C	POWER CONTACTOR
K	AUXILIARY CONTACTOR
PB	PUSH BUTTON
D	DIODE BRIDGE
CTD	CURRENT TRANSDUCER
VTD	VOLTAGE TRANSDUCER
TH	THERMOSTAT
SH	SPACE HEATER

CODE	PROTECTIVE RELAY DESCRIPTION
25	SYNCHRONISM
27	UNDER VOLTAGE
30&48	TRIP CIRCUIT ANNUNCIATION
46	NEGATIVE SEQUENCE TIME OVER CURRENT
50	GROUND INSTANTANEOUS OVER CURRENT
50BF	BREAKER FAILURE
50N	NEUTRAL INSTANTANEOUS OVER CURRENT
51	IDMT OVER CURRENT PROTECTION RELAY
51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
52	BREAKER
64R	RESTRICTED EARTH FAULT
74	TRIP CIRCUIT SUPERVISION
86	HAND RESET LOCKOUT RELAY
87	DIFFERENTIAL PROTECTION RELAY
94	ANTI PUMPING RELAY
95	TRIP CIRCUIT SUPERVISION RELAY
97	FUSE MONITORING RELAY
98	COMPOSITE MOTOR PROTECTION RELAY
99	FUSE FAILURE RELAY

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT11.05.15				CHECKED	JAGADISH		19.05.15	NA	CP-14-048	EP-3-CS-048-022	06	06	02
2	21.08.15	-				DRAWN	JAGADISH		19.05.15						
3						DESIGNED	JAGADISH		19.05.15						
4															

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTIVES DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
BIDIRECTIONAL MOTOR FEEDER BELOW 30KW CONTROLLED FROM LOP(N)



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA




CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

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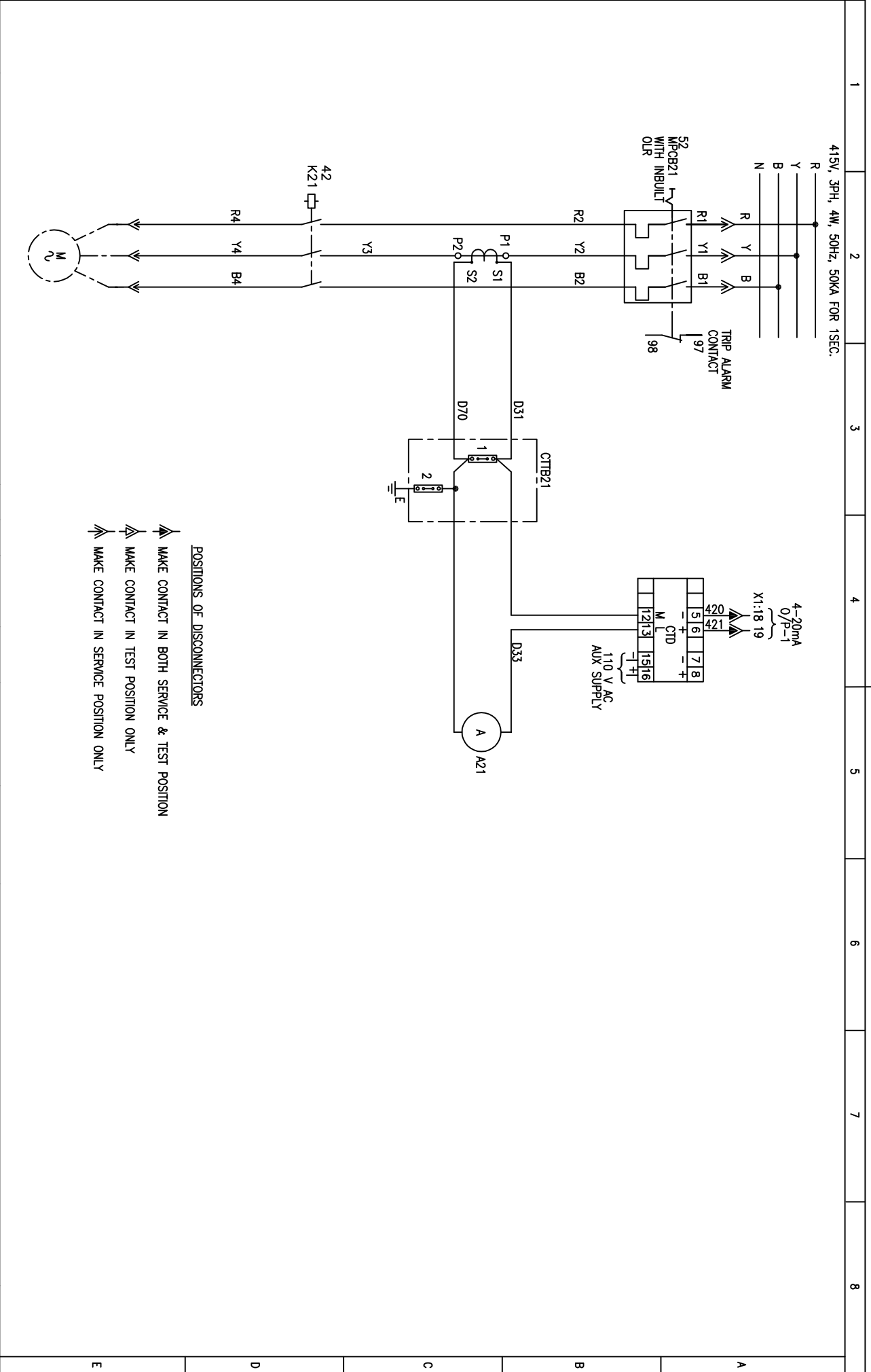
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DRG. NO. EP-3-CS-048-023

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-023	NO. OF SHEETS	REV.	
1					CHECKED	JAGADISH		19.04.16		BHARAT HEAVY ELECTRICALS LIMITED ELECTROFORCELANS DIVISION BANGALORE POWER AND CONTROL SCHEME CRITICAL MOTOR FEEDER BELOW 30KW		05	01	
2				DRAWN										
3				DESIGNED	JAGADISH		19.04.16							
4														

DRG. NO. EP-3-CS-048-023



POSITIONS OF DISCONNECTORS

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

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO.	CP-14-048	DRG. NO.	EP-3-CS-048-023	NO. OF SHEETS	05	REV.	00
1					CHECKED	JAGADISH		19.04.16					02		
2					DRAWN										
3					DESIGNED	JAGADISH		19.04.16							
4															



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROCELAIN DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
CRITICAL MOTOR FEEDER BELOW 30KW

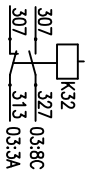
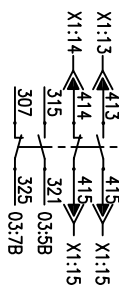
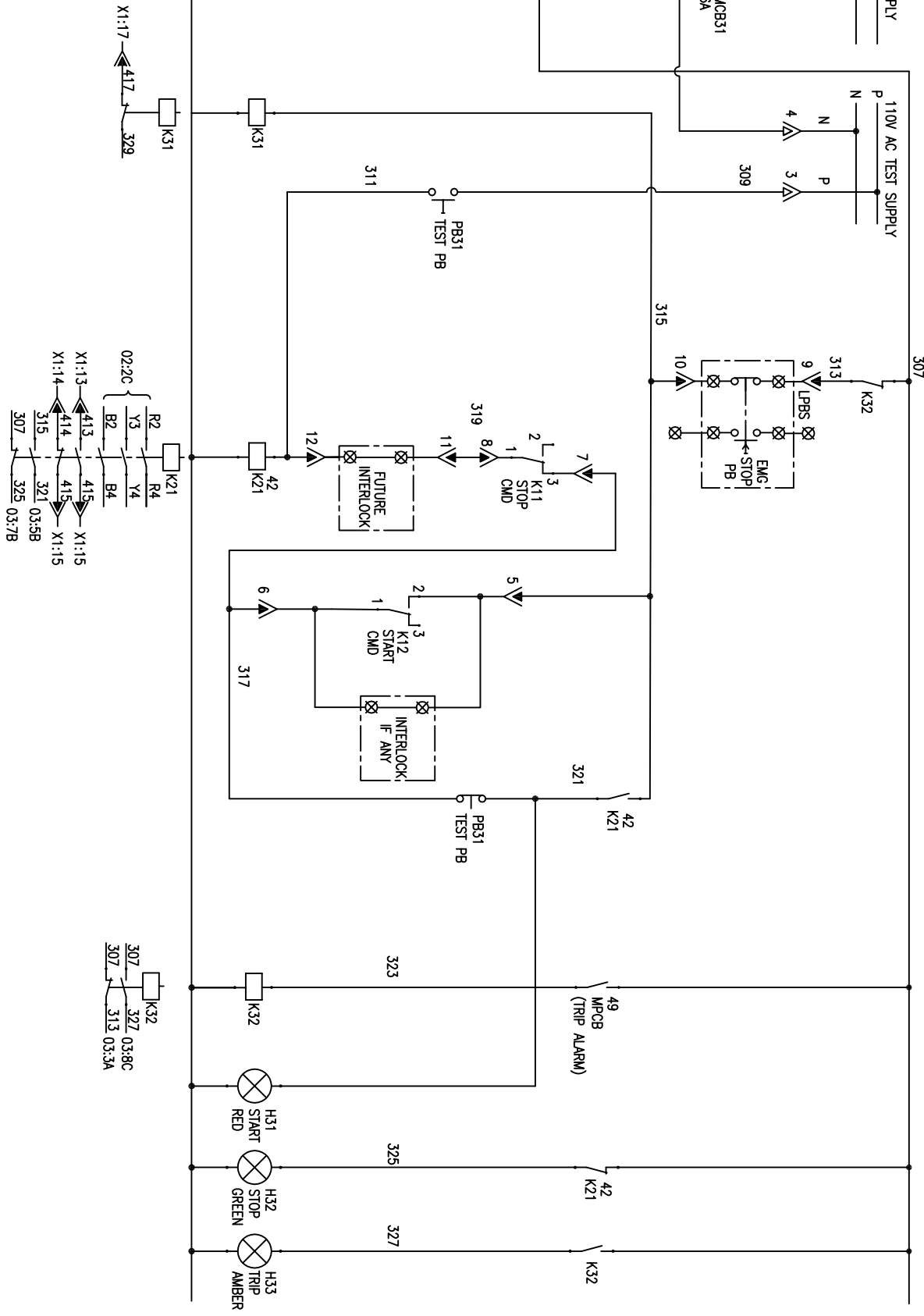
EP-3-CS-048-023

DRG. NO.

INVENTORY NO.

FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM

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



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-023	REV. NO. 00
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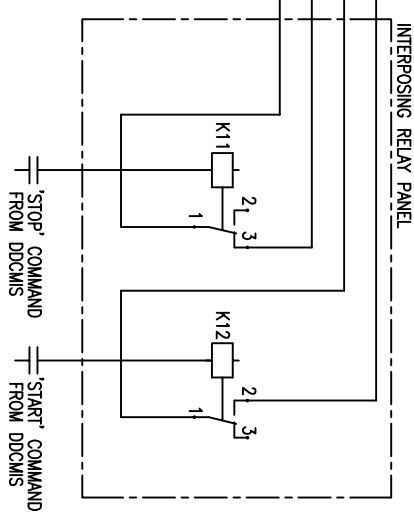
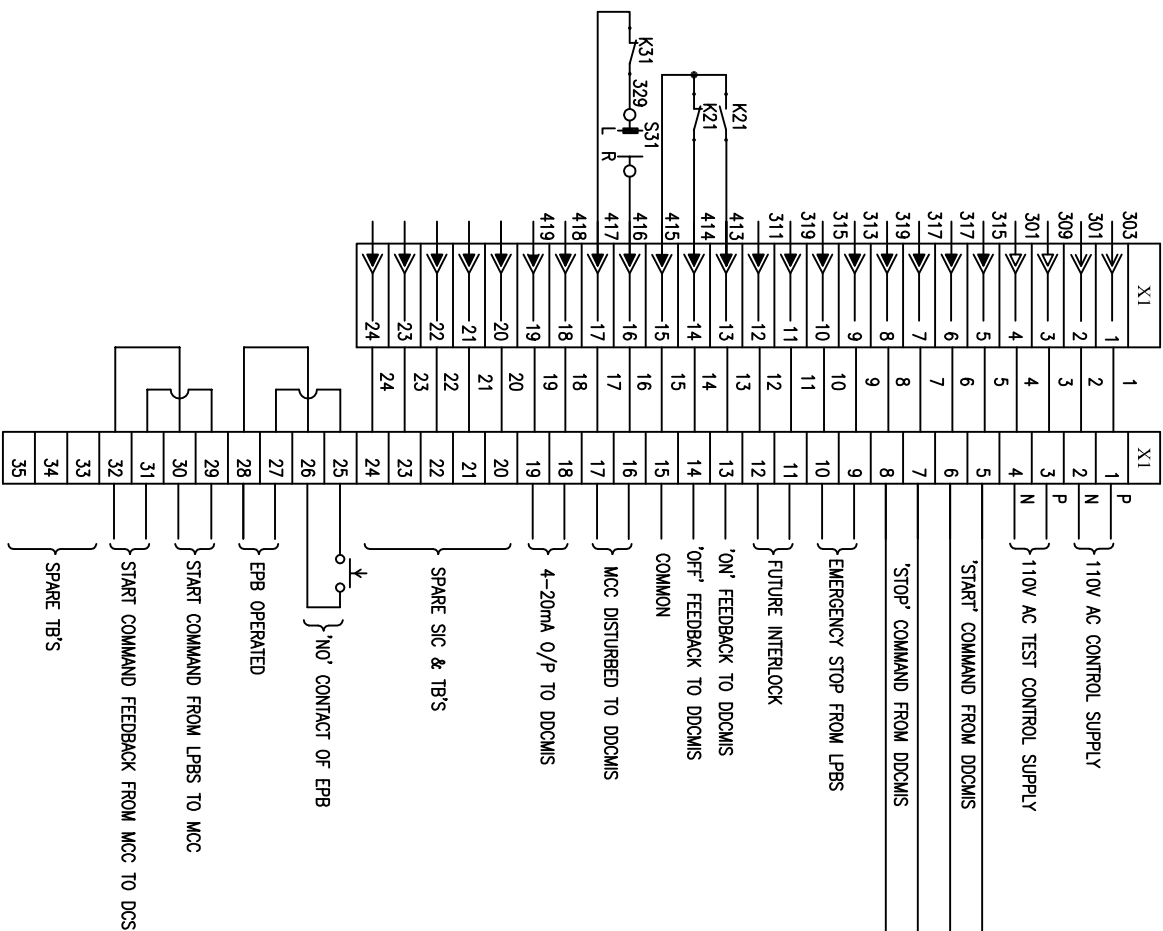
**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROCELAIN DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
CRITICAL MOTOR FEEDER BELOW 30KW

NO. OF SHEETS: 05  
SHEET NO.: 03

DRG. NO. EP-3-CS-048-023

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO.	DRG. NO.	NO. OF SHEETS	REV.
1					CHECKED	JAGADISH	19.04.16	CP-14-048	EP-3-CS-048-023	04	00
2					DRAWN					05	
3					DESIGNED	JAGADISH	19.04.16				
4											



FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROCELAIN DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
CRITICAL MOTOR FEEDER BELOW 30KW



NO. OF SHEETS: 05  
SHEET NO.: 04



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA







CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANT PVT LTD  
KOLKATA

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DRG. NO. EP-4-CS-048-024

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	CHECKED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-024	NO. OF SHEETS	NO. OF SHEETS	REV.
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT11.05.15			CHECKED	JAGADISH KSB		13.03.15				03	01	01
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3					DESIGNED	JAGADISH		13.03.15						
4														

BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROPOWERCELLS DIVISION BANGALORE

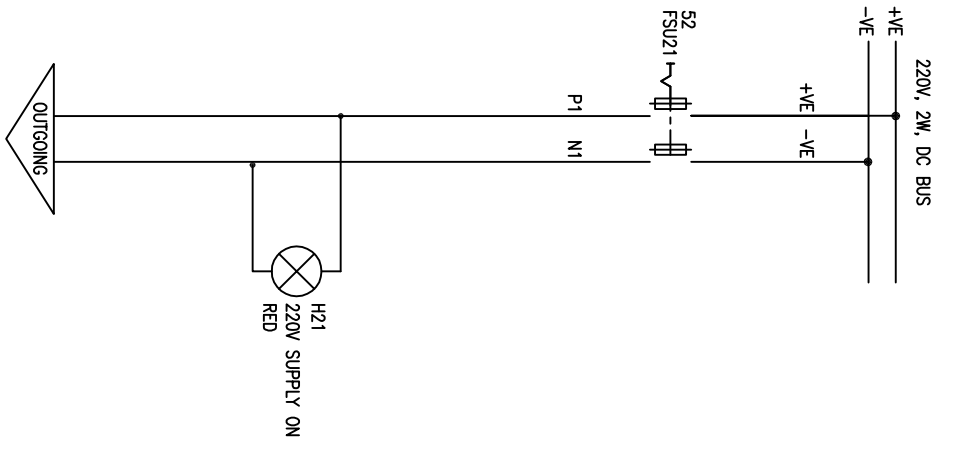
TITLE :  
POWER AND CONTROL SCHEME  
DC OUTGOING FEEDER



DRG. NO. EP-4-CS-048-024

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT11.05.15	<i>[Signature]</i>	<i>[Signature]</i>	CHECKED	JAGADISH	<i>[Signature]</i>	13.03.15
2					DRAWN	JAGADISH	<i>[Signature]</i>	13.03.15
3					DESIGNED	JAGADISH	<i>[Signature]</i>	13.03.15
4								



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1 2 3 4 5 6 7 8



**BHARAT HEAVY ELECTRICALS LIMITED**

ELECTROPROCESSING DIVISION BANGALORE

POWER AND CONTROL SCHEME

DC OUTGOING FEEDER

TITLE :	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-024	NO. OF SHEETS 03
SCALE: NA			SHEET NO. 02
			REV. NO. 01

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DRG. NO. EP-4-CS-048-024

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		OFF DELAY TIMER	
		ON DELAY TIMER	
		3 PIN SOCKET WITH SWITCH	
		EARTHING	
		TRANSDUCER	
		SELECTOR SWITCH	
		METER/RELAY	
		INDICATING LAMP	
		OFF DELAY TIMER	
		ON DELAY TIMER	
		MULTIPLICATION RELAY	
		LATCHED TYPE RELAY	
		AUXILIARY CONTACTOR	
		POWER CONTACTOR	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS
ACB	AIR CIRCUIT BREAKER
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
MPCB	MOTOR PROTECTION CB
FSU	FUSE SWITCH UNIT
IS	ISOLATOR
OLR	OVER LOAD RELAY
CT	CURRENT TRANSFORMER
PT	POTENTIAL TRANSFORMER
CTB	CT TESTING BOARD
F	FUSE
NL	NEUTRAL LINK
PS	POWER SOCKET
M	MOTOR
E	EARTHING
CST	CONTROL SUPPLY TRANSFORMER
A	AMMETER
V	VOLTMETER
ASS	AMMETER SELECTOR SWITCH
VSS	VOLTMETER SELECTOR SWITCH
W	WATT METER
WH	WATT HOUR METER
KWH	KILO WATT HOUR METER
PF	POWER FACTOR METER
MFM	MULTI FUNCTION METER
H	INDICATING LAMP
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K	AUXILIARY CONTACTOR
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D	DIODE BRIDGE
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SH	SPACE HEATER

CODE	PROTECTIVE RELAY DESCRIPTION
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50BF	BREAKER FAILURE
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51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
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64R	RESTRICTED EARTH FAULT
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86	HAND RESET LOCKOUT RELAY
87	DIFFERENTIAL PROTECTION RELAY
94	ANTI PUMPING RELAY
95	TRIP CIRCUIT SUPERVISION RELAY
97	FUSE MONITORING RELAY
98	COMPOSITE MOTOR PROTECTION RELAY
99	FUSE FAILURE RELAY

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4											CP-14-048	EP-4-CS-048-024	03	01
3							JAGADISH		19.05.15				03	
2													03	
1	16.05.15		REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT:11.05.15				JAGADISH		19.05.15				03	

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTIVES DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
DC OUTGOING FEEDER



FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM.

TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA







CUSTOMER:

PROJECT:  
1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANT PVT LTD  
KOLKATA

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It must not be used directly or indirectly in any way detrimental to the interest of the company

DRG. NO. EP-3-CS-048-025

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	CHECKED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	REV.
4														
3						DESIGNED	JAGADISH		21.05.15				03	
2						DRAWN								
1		21.08.15	REVISED AS PER CUSTOMER COMMENTS LETTER REF. NO. 0492, DT:12.08.15			CHECKED	JAGADISH		21.05.15		CP-14-048	EP-3-CS-048-025	01	01



BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROPROCELANS DIVISION BANGALORE  
POWER SCHEME  
24V AC MOTOR WINDING HEATER SUPPLY

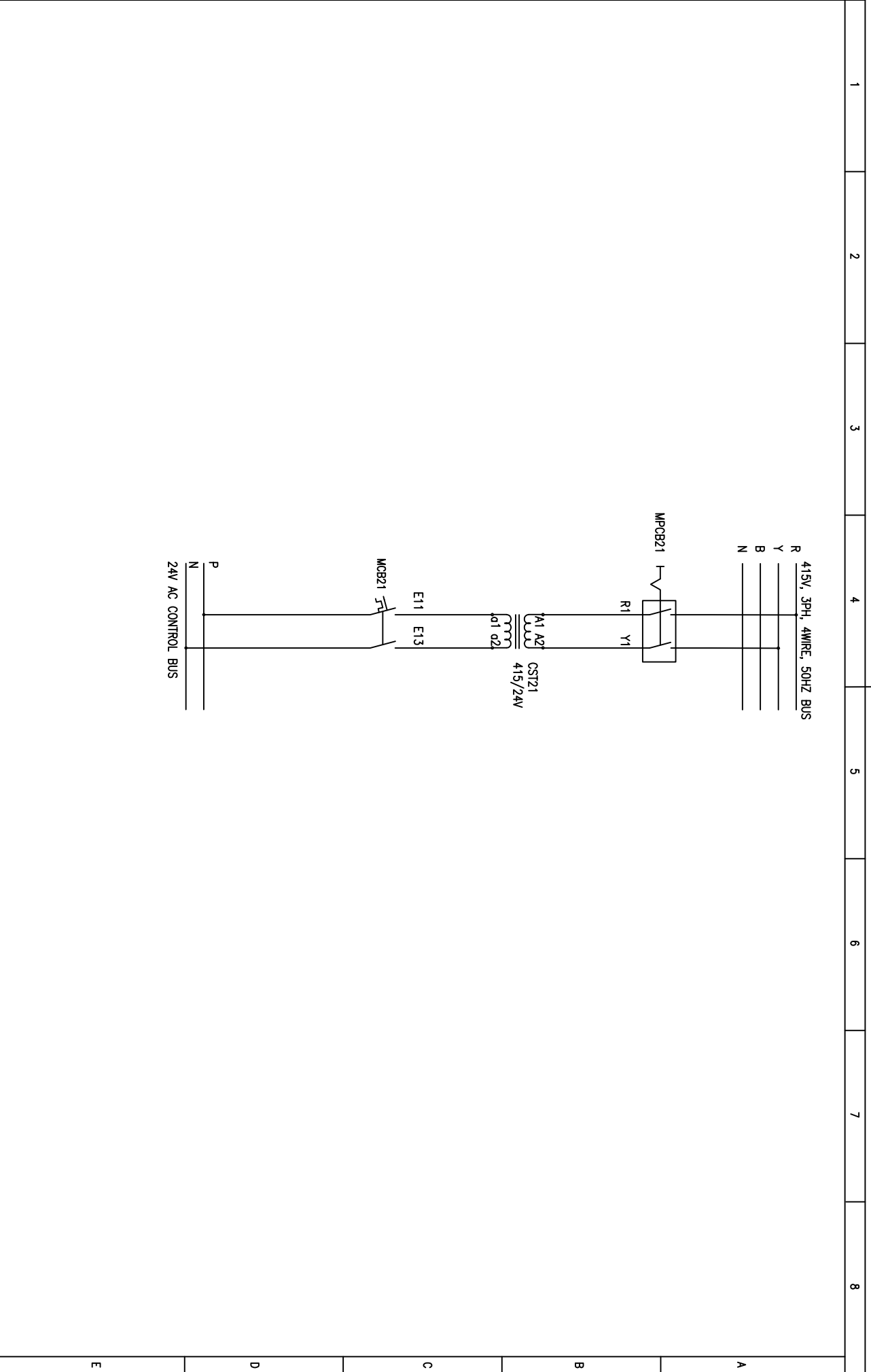
DRG. NO. EP-3-CS-048-025

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB
1	21.08.15	REVISED AS PER CUSTOMER COMMENTS LETTER REF. NO. 0492, DT:12.08.15	<i>[Signature]</i>	<i>[Signature]</i>	CHECKED	JAGADISH
2					DRAWN	JAGADISH
3					DESIGNED	JAGADISH
4						



<b>BHARAT HEAVY ELECTRICALS LIMITED</b> ELECTROPROCELAIN DIVISION BANGALORE		NO. OF SHEETS: 03 SHEET NO.: 02
TITLE: 24V AC MOTOR WINDING HEATER SUPPLY	JOB NO. CP-14-048 DRG. NO. EP-3-CS-048-025	SCALE: NA



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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DRG. NO. EP-3-CS-048-025

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
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		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
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		OFF DELAY TIMER	
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FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1 2 3 4 5 6 7 8

CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:



DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

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DRG. NO. EP-3-CS-048-026

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-026	NO. OF SHEETS	NO. OF SHEETS	REV.
4													03	01	00
3						DESIGNED	JAGADISH		19.04.16						
2						DRAWN									
1						CHECKED	JAGADISH		19.04.16						

BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE

TITLE :  
240V AC SPACE HEATER SUPPLY





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DRG. NO. EP-3-CS-048-026

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTRACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		TIMED CLOSING CONTACT	
		OFF DELAY TIMER	
		TIMED OPENING CONTACT	
		ON DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		OFF DELAY TIMER	
		INSTANTANEOUS OPEN DELAYED CLOSING CONT.	
		NORMALLY OPEN BUTTON PB	
		NORMALLY CLOSE BUTTON PB	
		MUSHROOM HEAD EMERGENCY STOP PB	
		SELECTOR SWITCH SS	
		POWER CONTACTOR	
		AUXILIARY CONTACTOR	
		MULTIPLICATION RELAY	
		LATCHED TYPE RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INDICATING LAMP	
		METER/RELAY	
		SELECTOR SWITCH	
		TRANSDUCER	
		EARTHING	
		3 PIN SOCKET WITH SWITCH	
		MOTOR	
		HEATER	
		INTERNALLY WIRED TERMINAL	
		OUTGOING TERMINAL	
		DRAWOUT/DISCONNECTOR	
		DIODE	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
AGB	AIR CIRCUIT BREAKER	25	SYNCHRONISM
MCB	MINIATURE CIRCUIT BREAKER	27	UNDER VOLTAGE
MCCB	MOULDED CASE CIRCUIT BREAKER	30&48	TRIP CIRCUIT ANNUNCIATION
MPCB	MOTOR PROTECTION CB	46	NEGATIVE SEQUENCE TIME OVER CURRENT
FSU	FUSE SWITCH UNIT	50	GROUND INSTANTANEOUS OVER CURRENT
IS	ISOLATOR	50BF	BREAKER FAILURE
OLR	OVER LOAD RELAY	50N	NEUTRAL INSTANTANEOUS OVER CURRENT
CT	CURRENT TRANSFORMER	51	IDMT OVER CURRENT PROTECTION RELAY
PT	POTENTIAL TRANSFORMER	51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
CTB	CT TESTING BOARD	52	BREAKER
F	FUSE	64R	RESTRICTED EARTH FAULT
NL	NEUTRAL LINK	74	TRIP CIRCUIT SUPERVISION
PS	POWER SOCKET	86	HAND RESET LOCKOUT RELAY
M	MOTOR	87	DIFFERENTIAL PROTECTION RELAY
E	EARTHING	94	ANTI PUMPING RELAY
CST	CONTROL SUPPLY TRANSFORMER	95	TRIP CIRCUIT SUPERVISION RELAY
A	AMMETER	97	FUSE MONITORING RELAY
V	VOLTMETER	98	COMPOSITE MOTOR PROTECTION RELAY
ASS	AMMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
VSS	VOLTMETER SELECTOR SWITCH		
W	WATT METER		
WH	WATT HOUR METER		
KWH	KILO WATT HOUR METER		
PF	POWER FACTOR METER		
MFM	MULTI FUNCTION METER		
H	INDICATING LAMP		
NR	NUMERICAL RELAY		
SS	SELECTOR SWITCH		
C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSDUCER		
VTD	VOLTAGE TRANSDUCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	4	NAME	JAGADISH	DATE	19.04.16	SCALE	NA	JOB NO.	CP-14-048	DRG. NO.	EP-3-CS-048-026
REV. NO.	1	DESCRIPTION	CHECKED	JAGADISH	19.04.16			TITLE :	POWER SCHEME	NO. OF SHEETS	03
DATE		BY	APPD.	APPROVED	KSB	19.04.16			240V AC SPACE HEATER SUPPLY	SHEET NO.	03
										REV.	00

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTRONICCELLS DIVISION BANGALORE

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DRG. NO. EP-3-CS-048-027

FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM.











CUSTOMER:

TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

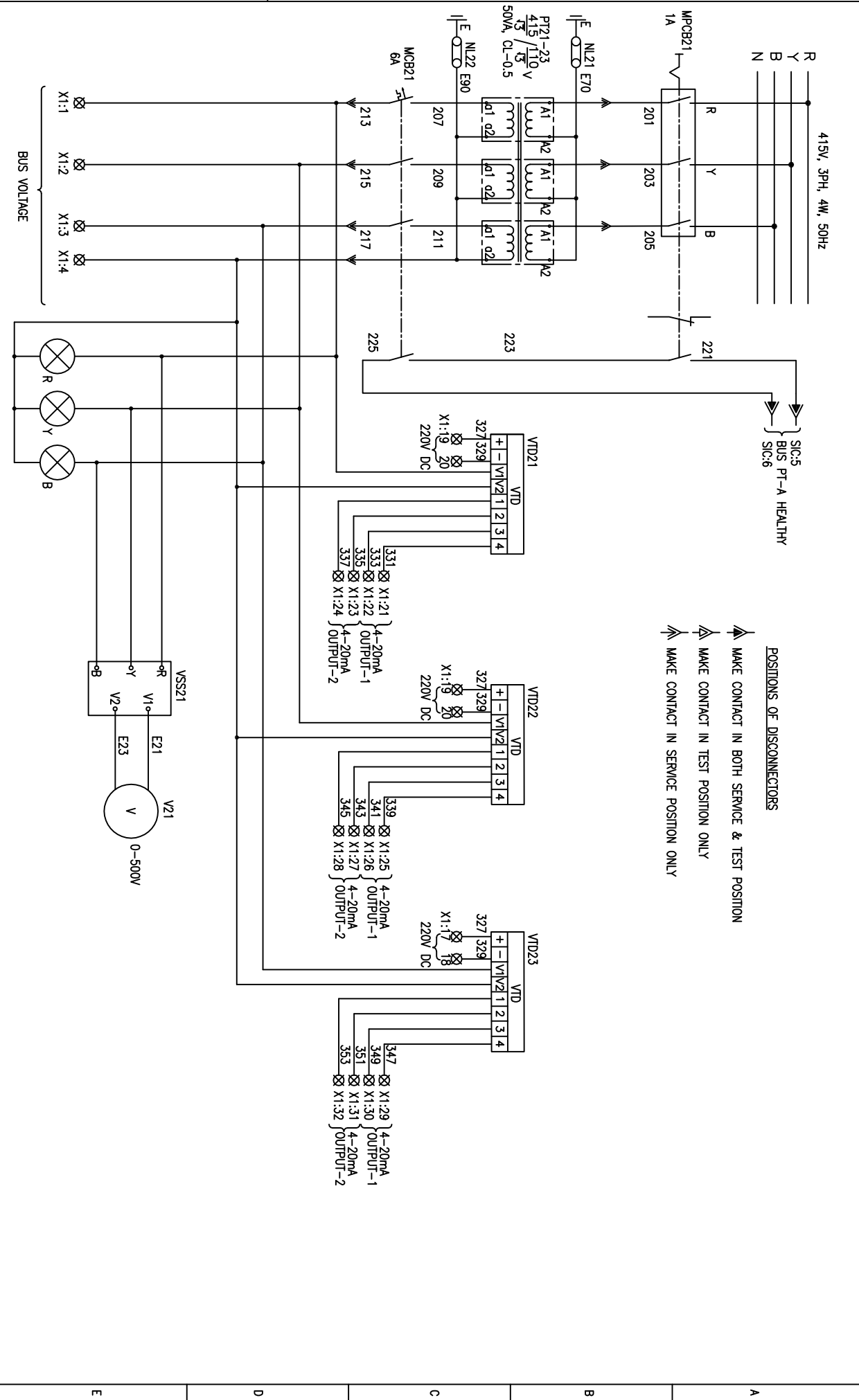
PROJECT:  
1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

REV. NO.	DATE	DESCRIPTION	BY	APPD.	CHECKED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-027	NO. OF SHEETS	NO. OF SHEETS	REV.
4														
3	04.7.15	REVISED AS PER CUSTOMER LETTER NO 0564 DTD 04.09.15			DESIGNED	JAGADISH		19.04.15		BHARAT HEAVY ELECTRICALS LIMITED ELECTROFORCELANS DIVISION BANGALORE		04	04	
2	22.8.15	REVISED AS PER CUSTOMER LETTER NO 0300 DTD 02.06.15			DRAWN									
1	20.5.15	REVISED AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15			CHECKED	JAGADISH	19.04.15							
						KSB	19.04.15							

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DRG. NO. EP-3-CS-048-027



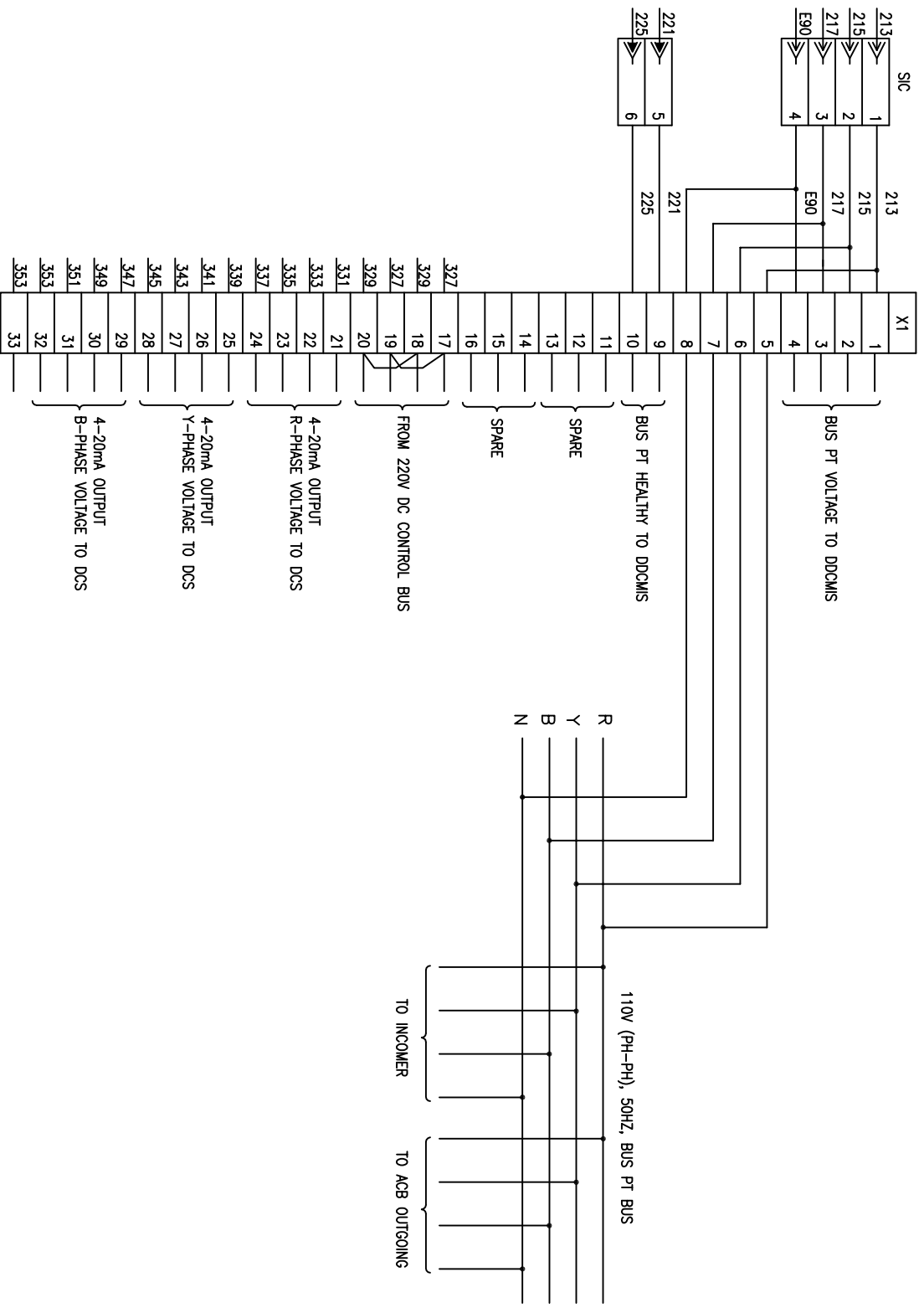
POSITIONS OF DISCONNECTORS  
 MAKE CONTACT IN BOTH SERVICE & TEST POSITION  
 MAKE CONTACT IN TEST POSITION ONLY  
 MAKE CONTACT IN SERVICE POSITION ONLY

INVENTORY NO.	4																				
REV. NO.	1	20.5.15	REVISED AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15																		
DATE	20.5.15																				
DESCRIPTION	BHARAT HEAVY ELECTRICALS LIMITED ELECTROPOWERCELLS DIVISION BANGALORE																				
BY	JAGADISH																				
APPD.	JAGADISH																				
APPROVED	KSB																				
DATE	19.04.15																				
SCALE	NA																				
JOB NO.	CP-14-048																				
DRG. NO.	EP-3-CS-048-027																				
TITLE	BUS PT FOR PMCC																				
NO. OF SHEETS	04																				
SHEET NO.	02																				
REV.	00																				

DRG. NO. EP-3-CS-048-027

FORM 66-271 A3

1	2	3	4	5	6	7	8
FIRST ANGLE PROJECTION				ALL DIMENSIONS ARE IN MM.			



REV. NO.	DATE	DESCRIPTION
1	20.5.15	REVISED AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15
2	22.8.15	REVISED AS PER CUSTOMER LETTER NO 0300 DTD 02.06.15
3	04.7.15	REVISED AS PER CUSTOMER LETTER NO 0564 DTD 04.09.15
4		

BY	APPD.	APPROVED	NAME	SIGN.	DATE
			JAGADISH		19.04.15
			JAGADISH		19.04.15
			KSB		19.04.15



NOTE:- THIS DRAWING IS ALSO APPLICABLE FOR BUS SECTION A & B (BUS PT-A & BUS PT-B)

<b>BHARAT HEAVY ELECTRICALS LIMITED</b> ELECTROPROTECTIANS DIVISION BANGALORE		NO. OF SHEETS: 04 SHEET NO.: 03
TITLE:	BUS PT FOR PMCC	REV. NO.: 00
JOB NO.	CP-14-048	DRG. NO. EP-3-CS-048-027
SCALE:	NA	

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DRG. NO. EP-3-CS-048-027

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
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		POWER CONTRACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		TIMED CLOSING CONTACT	
		OFF DELAY TIMER	
		TIMED OPENING CONTACT	
		ON DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		OFF DELAY TIMER	
		INSTANTANEOUS CLOSING CONT.	
		NORMALLY OPEN BUTTON PB	
		NORMALLY CLOSE BUTTON PB	
		MUSHROOM HEAD EMERGENCY STOP PB	
		SELECTOR SWITCH SS	
		POWER CONTACTOR	
		AUXILIARY CONTACTOR	
		MULTIPLICATION RELAY	
		LATCHED TYPE RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INDICATING LAMP	
		METER/RELAY	
		SELECTOR SWITCH	
		TRANSDUCER	
		EARTHING	
		3 PIN SOCKET WITH SWITCH	
		MOTOR	
		HEATER	
		INTERNALLY WIRED TERMINAL	
		OUTGOING TERMINAL	
		DRAWOUT/DISCONNECTOR	
		DIODE	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
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F	FUSE	64R	RESTRICTED EARTH FAULT
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M	MOTOR	87	DIFFERENTIAL PROTECTION RELAY
E	EARTHING	94	ANTI PUMPING RELAY
CST	CONTROL SUPPLY TRANSFORMER	95	TRIP CIRCUIT SUPERVISION RELAY
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V	VOLTMETER	98	COMPOSITE MOTOR PROTECTION RELAY
ASS	AMMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
VSS	VOLTMETER SELECTOR SWITCH		
W	WATT METER		
WH	WATT HOUR METER		
KWH	KILO WATT HOUR METER		
PF	POWER FACTOR METER		
MFM	MULTI FUNCTION METER		
H	INDICATING LAMP		
NR	NUMERICAL RELAY		
SS	SELECTOR SWITCH		
C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSDUCER		
VTD	VOLTAGE TRANSDUCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	4	REV. NO.	1	DATE	20.5.15	DESCRIPTION	REVISD AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15	BY	APPD.	APPROVED	NAME	SIGN.	DATE	19.04.15	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-027	NO. OF SHEETS	04	SHEET NO.	04	REV.	00
	3		2		22.8.15		REVISD AS PER CUSTOMER LETTER NO 0300 DTD 02.06.15				JAGADISH		19.04.15										
	2		1		04.7.15		REVISD AS PER CUSTOMER LETTER NO 0564 DTD 04.09.15				JAGADISH												

BHARAT HEAVY ELECTRICALS LIMITED  
 ELECTRONICRELIANS DIVISION BANGALORE



DRG. NO. EP-4-CS-048-028

1	2	3	4	5	6	7	8
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FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



CUSTOMER:

TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-028	NO. OF SHEETS	REV.
4	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.6.16										04	04
3	27.5.15	REVISED AS PER CUSTOMER LETTER NO 0564 DTD 04.09.15			DESIGNED	JAGADISH		17.04.15				01	04
2	22.8.15	REVISED AS PER CUSTOMER LETTER NO 0300 DTD 02.06.15			DRAWN							01	04
1	20.5.15	REVISED AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15			CHECKED	JAGADISH		17.04.15				01	04

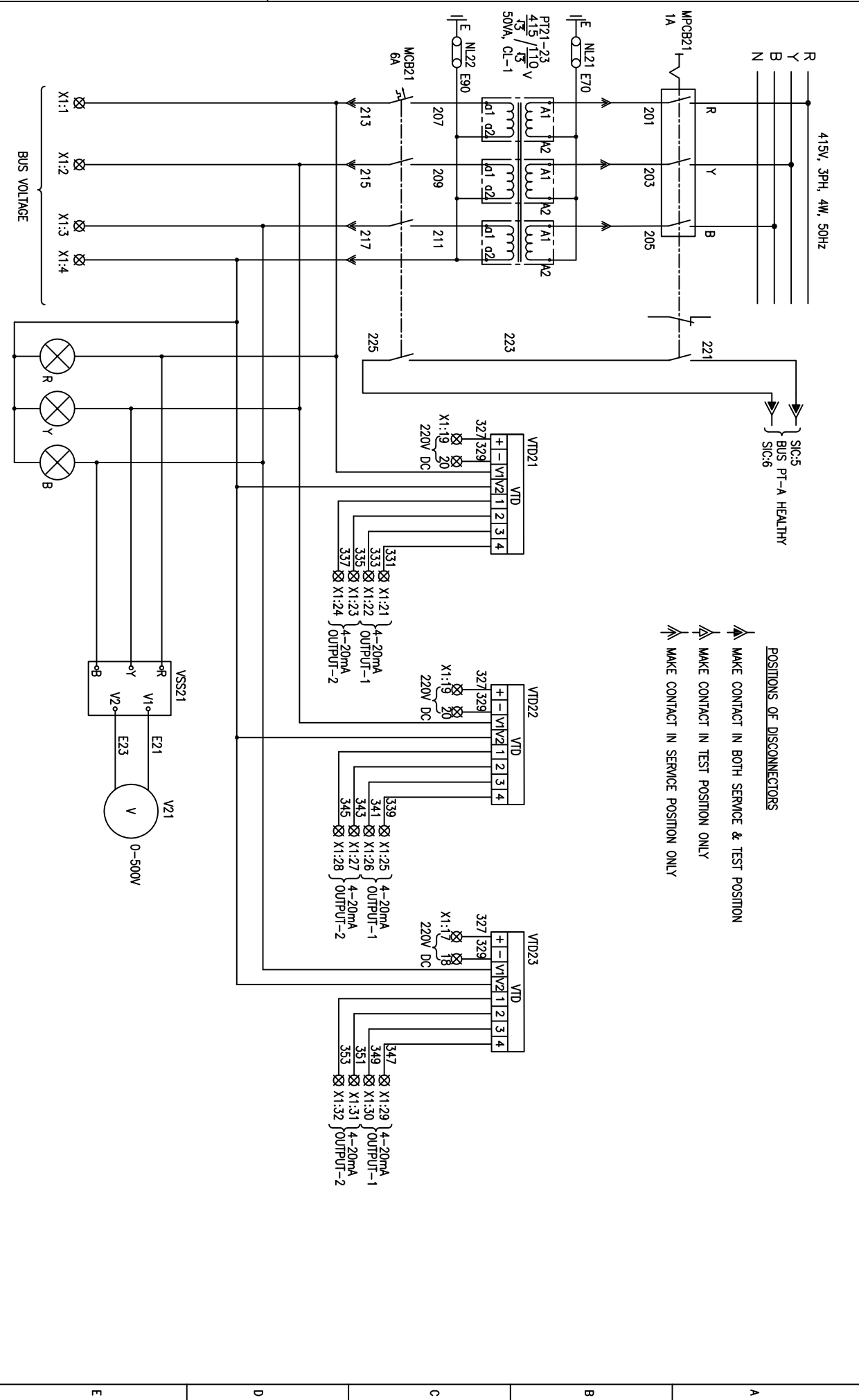


BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROPROCELANS DIVISION BANGALORE

TITLE :  
BUS PT FOR MCC/ACDB

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DRG. NO. EP-4-CS-048-028



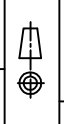
POSITIONS OF DISCONNECTORS  
 S1C:5 } BUS PT-A HEALTHY  
 S1C:6 }  
 MAKE CONTACT IN BOTH SERVICE & TEST POSITION  
 MAKE CONTACT IN TEST POSITION ONLY  
 MAKE CONTACT IN SERVICE POSITION ONLY

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-028	NO. OF SHEETS	SHEET NO.	REV.
1	20.5.15	REVISED AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15			CHECKED	JAGADISH				04	02	04
2	22.8.15	REVISED AS PER CUSTOMER LETTER NO 0300 DTD 02.06.15			DRAWN							
3	27.5.15	REVISED AS PER CUSTOMER LETTER NO 0564 DTD 04.09.15			DESIGNED	JAGADISH						
4	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.6.16										

**BHARAT HEAVY ELECTRICALS LIMITED**  
 ELECTROPOWERELANS DIVISION BANGALORE



TITLE :  
 BUS PT FOR MCC/ACDB

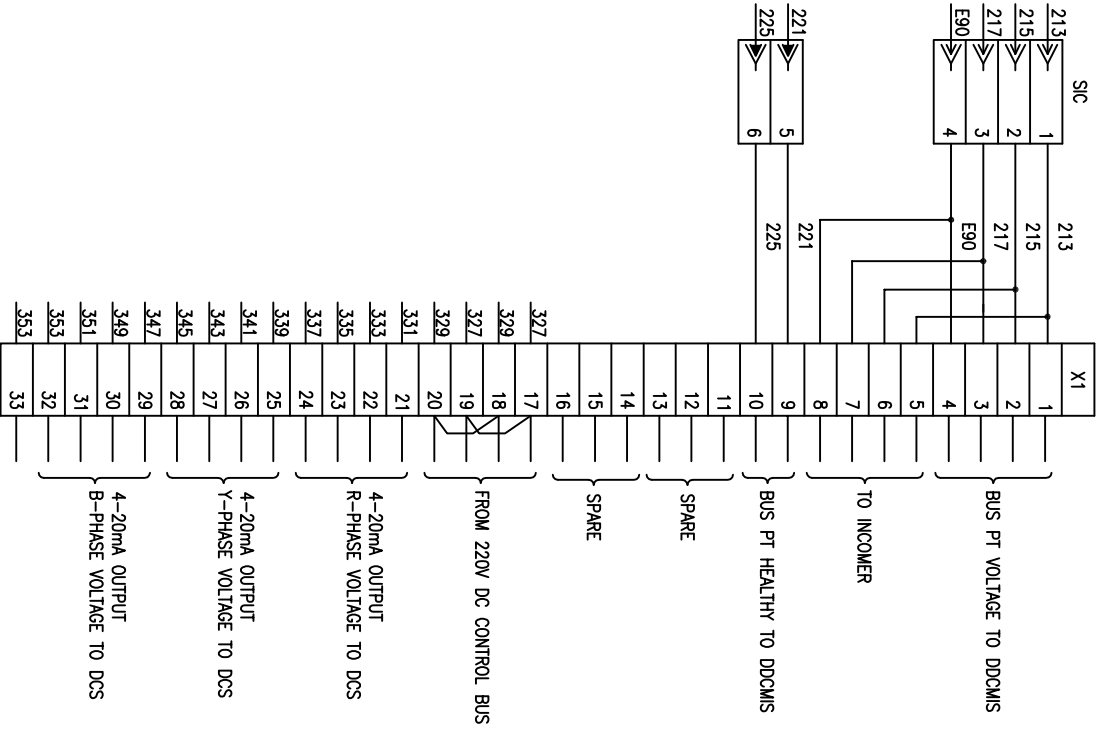


NO. OF SHEETS: 04  
 SHEET NO.: 02

DRG. NO. EP-4-CS-048-028

FORM 66-271 A4

FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE
4	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.6.16	[Signature]	[Signature]				
3	27.5.15	REVISED AS PER CUSTOMER LETTER NO 0564 DTD 04.09.15	[Signature]	[Signature]	DESIGNED	JAGADISH	[Signature]	17.04.15
2	22.8.15	REVISED AS PER CUSTOMER LETTER NO 0300 DTD 02.06.15	[Signature]	[Signature]	DRAWN			
1	20.5.15	REVISED AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15	[Signature]	[Signature]	CHECKED	JAGADISH	[Signature]	17.04.15

NOTE:-  
THIS DRAWING IS ALSO APPLICABLE FOR BUS SECTION  
A & B (BUS PT-A & BUS PT-B)

<b>BHARAT HEAVY ELECTRICALS LIMITED</b> ELECTROPOWERCELLS DIVISION BANGALORE	
TITLE :	BUS PT FOR MCC/ACDB
JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-028
NO. OF SHEETS: 04	NO. OF SHEETS: 03
REV. 04	

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DRG. NO. EP-4-CS-048-028

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTRACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		TIMED CLOSING CONTACT	
		OFF DELAY TIMER	
		TIMED OPENING CONTACT	
		ON DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		OFF DELAY TIMER	
		INSTANTANEOUS OPEN DELAYED CLOSING CONT.	
		NORMALLY OPEN BUTTON PB	
		NORMALLY CLOSE BUTTON PB	
		MUSHROOM HEAD EMERGENCY STOP PB	
		SELECTOR SWITCH SS	
		POWER CONTACTOR	
		AUXILIARY CONTACTOR	
		MULTIPLICATION RELAY	
		LATCHED TYPE RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INDICATING LAMP	
		METER/RELAY	
		SELECTOR SWITCH	
		TRANSDUCER	
		EARTHING	
		3 PIN SOCKET WITH SWITCH	
		MOTOR	
		HEATER	
		INTERNALLY WIRED TERMINAL	
		OUTGOING TERMINAL	
		DRAWOUT/DISCONNECTOR	
		DIODE	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
AGB	AIR CIRCUIT BREAKER	25	SYNCHRONISM
MCB	MINIATURE CIRCUIT BREAKER	27	UNDER VOLTAGE
MCCB	MOULDED CASE CIRCUIT BREAKER	30&48	TRIP CIRCUIT ANNUNCIATION
MPCB	MOTOR PROTECTION CB	46	NEGATIVE SEQUENCE TIME OVER CURRENT
FSU	FUSE SWITCH UNIT	50	GROUND INSTANTANEOUS OVER CURRENT
IS	ISOLATOR	50BF	BREAKER FAILURE
OLR	OVER LOAD RELAY	50N	NEUTRAL INSTANTANEOUS OVER CURRENT
CT	CURRENT TRANSFORMER	51	IDMT OVER CURRENT PROTECTION RELAY
PT	POTENTIAL TRANSFORMER	51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
CTB	CT TESTING BOARD	52	BREAKER
F	FUSE	64R	RESTRICTED EARTH FAULT
NL	NEUTRAL LINK	74	TRIP CIRCUIT SUPERVISION
PS	POWER SOCKET	86	HAND RESET LOCKOUT RELAY
M	MOTOR	87	DIFFERENTIAL PROTECTION RELAY
E	EARTHING	94	ANTI PUMPING RELAY
CST	CONTROL SUPPLY TRANSFORMER	95	TRIP CIRCUIT SUPERVISION RELAY
A	AMMETER	97	FUSE MONITORING RELAY
V	VOLTMETER	98	COMPOSITE MOTOR PROTECTION RELAY
ASS	AMMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
VSS	VOLTMETER SELECTOR SWITCH		
W	WATT METER		
WH	WATT HOUR METER		
KWH	KILO WATT HOUR METER		
PF	POWER FACTOR METER		
MFM	MULTI FUNCTION METER		
H	INDICATING LAMP		
NR	NUMERICAL RELAY		
SS	SELECTOR SWITCH		
C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSDUCER		
VTD	VOLTAGE TRANSDUCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-028
4	30.6.16		REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.6.16									
3	27.5.15		REVISED AS PER CUSTOMER LETTER NO 0564 DTD 04.09.15				JAGADISH		19.05.15			
2	22.8.15		REVISED AS PER CUSTOMER LETTER NO 0300 DTD 02.06.15				JAGADISH		19.05.15			
1	20.5.15		REVISED AS PER CUSTOMER LETTER NO 0203 DTD 11.05.15				JAGADISH		19.05.15			

**BHARAT HEAVY ELECTRICALS LIMITED**  
 ELECTRONIC RELAYS DIVISION BANGALORE

TITLE :  
 POWER SCHEME  
 BUS PT FOR MCC/ACDB

NO. OF SHEETS: 04  
 SHEET NO.: 04

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:



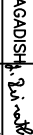


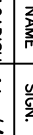
1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANT PVT LTD  
KOLKATA

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DRG. NO. EP-3-CS-048-029

REV. NO.	DATE	DESCRIPTION	BY	APPD.	CHECKED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-029	NO. OF SHEETS	NO. OF SHEETS	REV.
1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT11.05.15			CHECKED	JAGADISH KSB		17.04.15				04	01	01
2					DRAWN	JAGADISH		17.04.15						
3					DESIGNED	JAGADISH		17.04.15						
4														

BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROPOWERCELLS DIVISION BANGALORE

BUS PT FOR DG

TITLE :

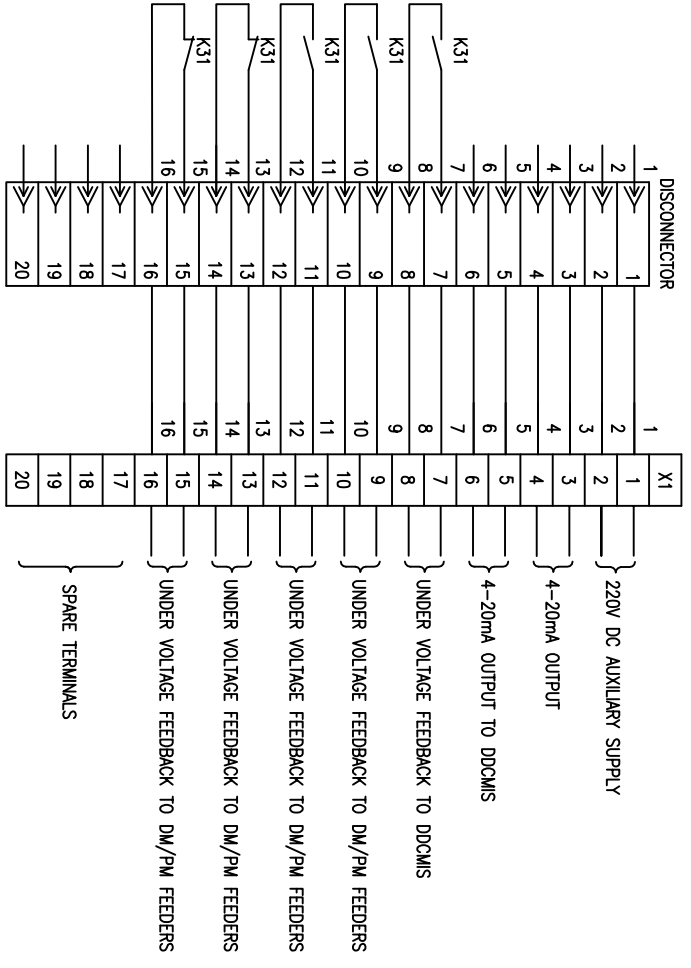
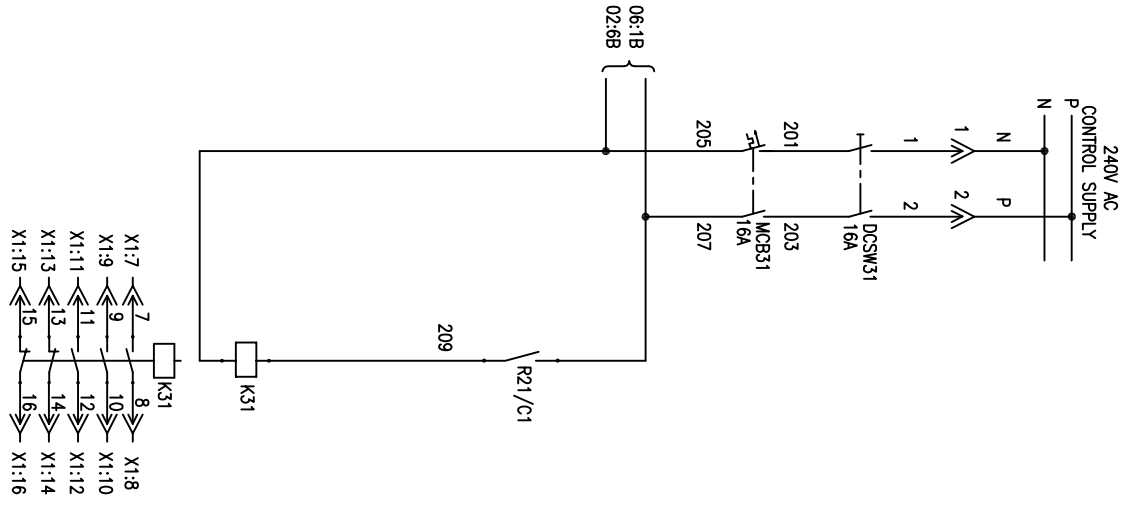


DRG. NO. EP-3-CS-048-029

FORM 66-271 A3

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-14-048	DRG. NO. EP-3-CS-048-029	
4	1	16.05.15	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT11.05.15				JAGADISH KSB		17.04.15				
3	2						JAGADISH		17.04.15				
2													
1													

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

TITLE :  
BUS PT FOR DG

NO. OF SHEETS	NO.
04	03
REV.	NO.
01	01

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DRG. NO. EP-3-CS-048-029

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT POWER CONTRACTOR MINIATURE CIRCUIT BREAKER OVER LOAD RELAY CURRENT TRANSFORMER	NORMALLY OPEN CONTACT NORMALLY CLOSE CONTACT CHANGE OVER CONTACT THERMAL OVER LOAD RELAY CLOSE CONTACT OFF DELAY TIMER ON DELAY TIMER TIMED OPENING CONTACT ON DELAY TIMER TIMED CLOSING CONTACT OFF DELAY TIMER INSTANTANEOUS CLOSE DELAYED OPENING CONT. OFF DELAY TIMER INSTANTANEOUS CLOSE DELAYED OPENING CONT. OFF DELAY TIMER INSTANTANEOUS CLOSE DELAYED OPENING CONT. OFF DELAY TIMER INSTANTANEOUS CLOSE DELAYED OPENING CONT.
		POTENTIAL TRANSFORMER HRC FUSE NEUTRAL LINK BUSDUCT	POWER CONTACTOR AUXILIARY CONTACTOR MULTIPLICATION RELAY LATCHED TYPE RELAY ON DELAY TIMER OFF DELAY TIMER INDICATING LAMP METER/RELAY SELECTOR SWITCH TRANSUDCER EARTHING 3 PIN SOCKET WITH SWITCH HEATER MOTOR INTERNALLY WIRED TERMINAL OUTGOING TERMINAL DRAWOUT/DISCONNECTOR DIODE

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS
ACB	AIR CIRCUIT BREAKER
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
MPCB	MOTOR PROTECTION CB
FSU	FUSE SWITCH UNIT
IS	ISOLATOR
OLR	OVER LOAD RELAY
CT	CURRENT TRANSFORMER
PT	POTENTIAL TRANSFORMER
CTB	CT TESTING BOARD
F	FUSE
NL	NEUTRAL LINK
PS	POWER SOCKET
M	MOTOR
E	EARTHING
CST	CONTROL SUPPLY TRANSFORMER
A	AMMETER
V	VOLTMETER
ASS	AMMETER SELECTOR SWITCH
VSS	VOLTMETER SELECTOR SWITCH
W	WATT METER
WH	WATT HOUR METER
KWH	KILO WATT HOUR METER
PF	POWER FACTOR METER
MFM	MULTI FUNCTION METER
H	INDICATING LAMP
NR	NUMERICAL RELAY
SS	SELECTOR SWITCH
C	POWER CONTRACTOR
K	AUXILIARY CONTACTOR
PB	PUSH BUTTON
D	DIODE BRIDGE
CTD	CURRENT TRANSUDCER
VTD	VOLTAGE TRANSUDCER
TH	THERMOSTAT
SH	SPACE HEATER

CODE	PROTECTIVE RELAY DESCRIPTION
25	SYNCHRONISM
27	UNDER VOLTAGE
30&28	TRIP CIRCUIT ANNUNCIATION
46	NEGATIVE SEQUENCE TIME OVER CURRENT
50	GROUND INSTANTANEOUS OVER CURRENT
50BF	BREAKER FAILURE
50N	NEUTRAL INSTANTANEOUS OVER CURRENT
51	IDMT OVER CURRENT PROTECTION RELAY
51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
52	BREAKER
64R	RESTRICTED EARTH FAULT
74	TRIP CIRCUIT SUPERVISION
86	HAND RESET LOCKOUT RELAY
87	DIFFERENTIAL PROTECTION RELAY
94	ANTI PUMPING RELAY
95	TRIP CIRCUIT SUPERVISION RELAY
97	FUSE MONITORING RELAY
98	COMPOSITE MOTOR PROTECTION RELAY
99	FUSE FAILURE RELAY

INVENTORY NO.	1	2	3	4
REV. NO.	16.05.15			
DATE	REVISED AS PER CUSTOMER COMMENTS LETTER NO. 0203, DT11.05.15			
DESCRIPTION				
BY				
APPD.				
APPROVED				
KSB				
SCALE: NA				
JOB NO. CP-14-048				
DRG. NO. EP-3-CS-048-029				
NAME	JAGADISH			
SIGN.				
DATE	17.04.15			
<b>BHARAT HEAVY ELECTRICALS LIMITED</b> ELECTROPROTECTIANS DIVISION BANGALORE				
TITLE : BUS PT FOR DG				
NO. OF SHEETS	04			
SHEET NO.	04			
REV.	01			

FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM.

CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:



DEVELOPMENT CONSULTANT PVT LTD  
KOLKATA

DRG. NO. EP-4-CS-048-030

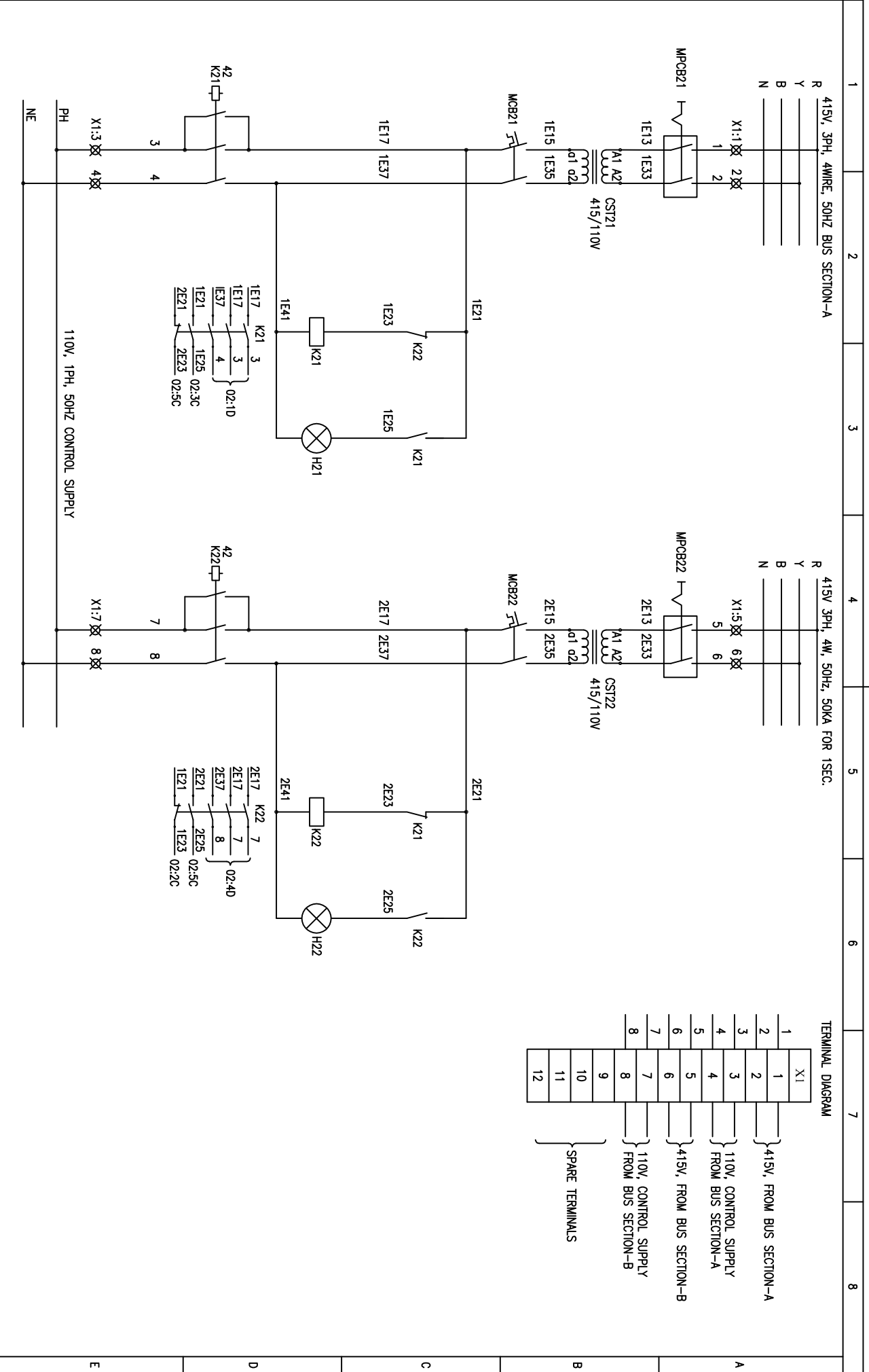
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REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-030	NO. OF SHEETS	NO. OF SHEETS	REV.
4												03	01	00
3					DESIGNED	JAGADISH		17.04.15						
2					DRAWN									
1					CHECKED	JAGADISH		17.04.15						



BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE  
TITLE :  
110V AC CONTROL SUPPLY

DRG. NO. EP-4-CS-048-030

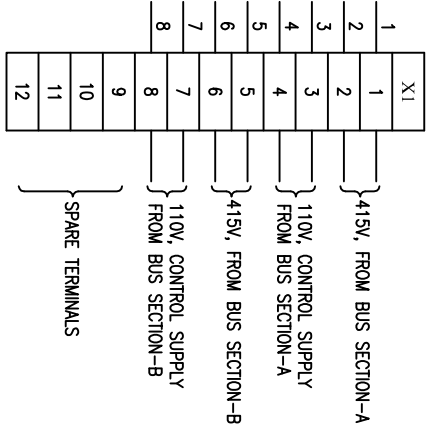


FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1 2 3 4 5 6 7 8

TERMINAL DIAGRAM



INVENTORY NO.	4	NAME		DATE		SCALE	NA	JOB NO.	CP-14-048	DRG. NO.	EP-4-CS-048-030
REV. NO.	1	DESIGNED	JAGADISH	17.04.15		TITLE :		BHARAT HEAVY ELECTRICALS LIMITED			
DATE	2	DRAWN		17.04.15		110V AC CONTROL SUPPLY		ELECTROPROCELANS DIVISION BANGALORE		NO. OF SHEETS: 03	
DESCRIPTION	3	CHECKED	JAGADISH	17.04.15						SHEET: 02	
BY	4	APPROVED		17.04.15						REV. 00	

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DRG. NO. EP-4-CS-048-030

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		3 PIN SOCKET WITH SWITCH	
		EARTHING	
		TRANSDUCER	
		SELECTOR SWITCH	
		METER/RELAY	
		INDICATING LAMP	
		OFF DELAY TIMER	
		ON DELAY TIMER	
		MULTIPLICATION RELAY LATCHED TYPE RELAY	
		AUXILIARY CONTACTOR	
		POWER CONTACTOR	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS
ACB	AIR CIRCUIT BREAKER
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
MPCB	MOTOR PROTECTION CB
FSU	FUSE SWITCH UNIT
IS	ISOLATOR
OLR	OVER LOAD RELAY
CT	CURRENT TRANSFORMER
PT	POTENTIAL TRANSFORMER
CTB	CT TESTING BOARD
F	FUSE
NL	NEUTRAL LINK
PS	POWER SOCKET
M	MOTOR
E	EARTHING
CST	CONTROL SUPPLY TRANSFORMER
A	AMMETER
V	VOLTMETER
ASS	AMMETER SELECTOR SWITCH
VSS	VOLTMETER SELECTOR SWITCH
W	WATT METER
WH	WATT HOUR METER
KWH	KILO WATT HOUR METER
PF	POWER FACTOR METER
MFM	MULTI FUNCTION METER
H	INDICATING LAMP
NR	NUMERICAL RELAY
SS	SELECTOR SWITCH
C	POWER CONTACTOR
K	AUXILIARY CONTACTOR
PB	PUSH BUTTON
D	DIODE BRIDGE
CTD	CURRENT TRANSDUCER
VTD	VOLTAGE TRANSDUCER
TH	THERMOSTAT
SH	SPACE HEATER

CODE	PROTECTIVE RELAY DESCRIPTION
25	SYNCHRONISM
27	UNDER VOLTAGE
30&48	TRIP CIRCUIT ANNUNCIATION
46	NEGATIVE SEQUENCE TIME OVER CURRENT
50	GROUND INSTANTANEOUS OVER CURRENT
50BF	BREAKER FAILURE
50N	NEUTRAL INSTANTANEOUS OVER CURRENT
51	IDMT OVER CURRENT PROTECTION RELAY
51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
52	BREAKER
64R	RESTRICTED EARTH FAULT
74	TRIP CIRCUIT SUPERVISION
86	HAND RESET LOCKOUT RELAY
87	DIFFERENTIAL PROTECTION RELAY
94	ANTI PUMPING RELAY
95	TRIP CIRCUIT SUPERVISION RELAY
97	FUSE MONITORING RELAY
98	COMPOSITE MOTOR PROTECTION RELAY
99	FUSE FAILURE RELAY

INVENTORY NO.	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-030	NO. OF SHEETS	SHEET NO.	REV.
1				CHECKED	JAGADISH		19.05.15				03	03	00
2				DRAWN									
3				DESIGNED	JAGADISH		19.05.15						
4													

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTIANS DIVISION BANGALORE

TITLE :  
POWER SCHEME  
110V AC CONTROL SUPPLY



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

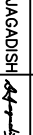
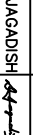
1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

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DRG. NO. EP-3-CS-048-031

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-031	NO. OF SHEETS	NO. OF SHEETS	REV.
4												04	01	00
3					DESIGNED	JAGADISH		17.04.15						
2					DRAWN									
1					CHECKED	JAGADISH		17.04.15						



BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROPROTECTIANS DIVISION BANGALORE

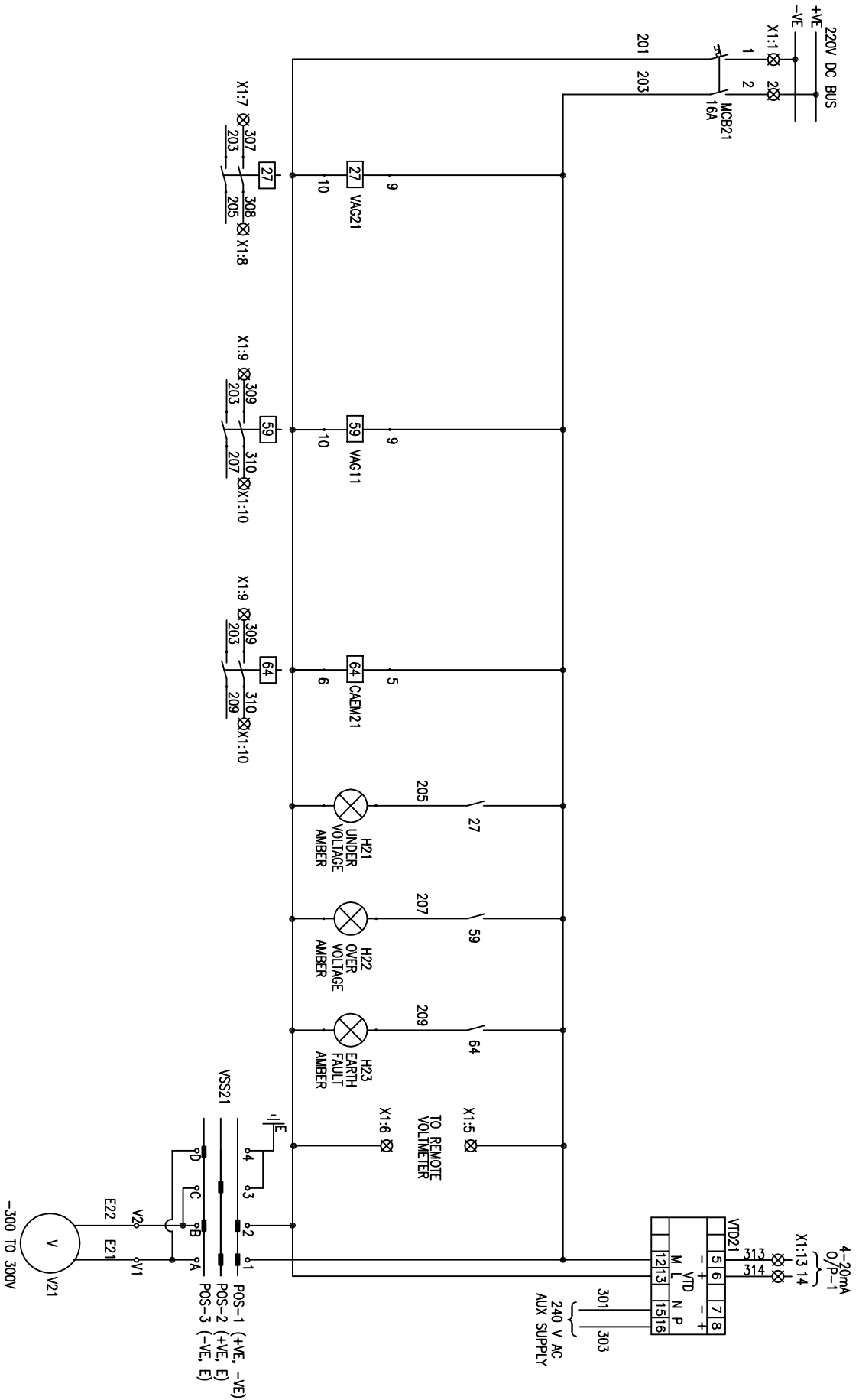
DC BUS METERING/RELAY MODULE

DRG. NO. EP-3-CS-048-031

FORM 66-271 A3

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH		17.04.15	NA	CP-14-048	EP-3-CS-048-031	04	02	00
2					DRAWN	JAGADISH		17.04.15						
3					DESIGNED	JAGADISH		17.04.15						
4														

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTIANS DIVISION BANGALORE

TITLE :  
DC BUS METERING/RELAY MODULE



NO. OF SHEETS: 04  
SHEET NO.: 02



1 2 3 4 5 6 7 8

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DRG. NO. EP-3-CS-048-031

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MFCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		TIMED CLOSING CONTACT	
		OFF DELAY TIMER	
		TIMED OPENING CONTACT	
		ON DELAY TIMER INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		OFF DELAY TIMER INSTANTANEOUS OPEN DELAYED CLOSING CONT.	
		NORMALLY OPEN BUTTON PB	
		NORMALLY CLOSE BUTTON PB	
		MUSHROOM HEAD EMERGENCY STOP PB	
		SELECTOR SWITCH SS	
		POWER CONTACTOR	
		AUXILIARY CONTACTOR	
		MULTIPLICATION RELAY LATCHED TYPE RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INDICATING LAMP	
		METER/RELAY	
		SELECTOR SWITCH	
		TRANSDUCER	
		EARTHING	
		3 PIN SOCKET WITH SWITCH	
		MOTOR	
		HEATER	
		INTERNALLY WIRED TERMINAL	
		OUTGOING TERMINAL	
		DRAWOUT/DISCONNECTOR	
		DIODE	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
AGB	AIR CIRCUIT BREAKER	25	SYNCHRONISM
MCB	MINIATURE CIRCUIT BREAKER	27	UNDER VOLTAGE
MCCB	MOULDED CASE CIRCUIT BREAKER	30&48	TRIP CIRCUIT ANNUNCIATION
MFCB	MOTOR PROTECTION CB	46	NEGATIVE SEQUENCE TIME OVER CURRENT
FSU	FUSE SWITCH UNIT	50	GROUND INSTANTANEOUS OVER CURRENT
IS	ISOLATOR	50BF	BREAKER FAILURE
OLR	OVER LOAD RELAY	50N	NEUTRAL INSTANTANEOUS OVER CURRENT
CT	CURRENT TRANSFORMER	51	IDMT OVER CURRENT PROTECTION RELAY
PT	POTENTIAL TRANSFORMER	51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
CTB	CT TESTING BOARD		
F	FUSE	52	BREAKER
NL	NEUTRAL LINK	64R	RESTRICTED EARTH FAULT
PS	POWER SOCKET	74	TRIP CIRCUIT SUPERVISION
M	MOTOR	86	HAND RESET LOCKOUT RELAY
E	EARTHING	87	DIFFERENTIAL PROTECTION RELAY
CST	CONTROL SUPPLY TRANSFORMER	94	ANTI PUMPING RELAY
A	AMMETER	95	TRIP CIRCUIT SUPERVISION RELAY
V	VOLTMETER	97	FUSE MONITORING RELAY
ASS	AMMETER SELECTOR SWITCH	98	COMPOSITE MOTOR PROTECTION RELAY
VSS	VOLTMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
W	WATT METER		
WH	WATT HOUR METER		
KWH	KILO WATT HOUR METER		
PF	POWER FACTOR METER		
MFM	MULTI FUNCTION METER		
H	INDICATING LAMP		
NR	NUMERICAL RELAY		
SS	SELECTOR SWITCH		
C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSDUCER		
VTD	VOLTAGE TRANSDUCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	4	NAME	JAGADISH	DATE	19.05.15	SCALE	NA	JOB NO.	CP-14-048	DRG. NO.	EP-3-CS-048-031
REV. NO.	1	DESCRIPTION	CHECKED	JAGADISH	19.05.15						
DATE		BY	APPD.	APPROVED	KSB						
	2		DRAWN								
	3	DESIGNED	JAGADISH	19.05.15							

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTRONIC RELAYS DIVISION BANGALORE

TITLE :  
POWER SCHEME  
DC BUS METERING/RELAY MODULE

NO. OF SHEETS : 04  
SHEET NO. : 04

REV. NO. : 00

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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4

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

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DRG. NO. EP-3-CS-048-032

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-032	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16	[Signature]	[Signature]	CHECKED	JAGADISH	[Signature]	19.04.16				05	01	01
2					DRAWN	JAGADISH	[Signature]	19.04.16						
3					DESIGNED	JAGADISH	[Signature]	19.04.16						
4														

CUSTOMER CONSULTANT:  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA



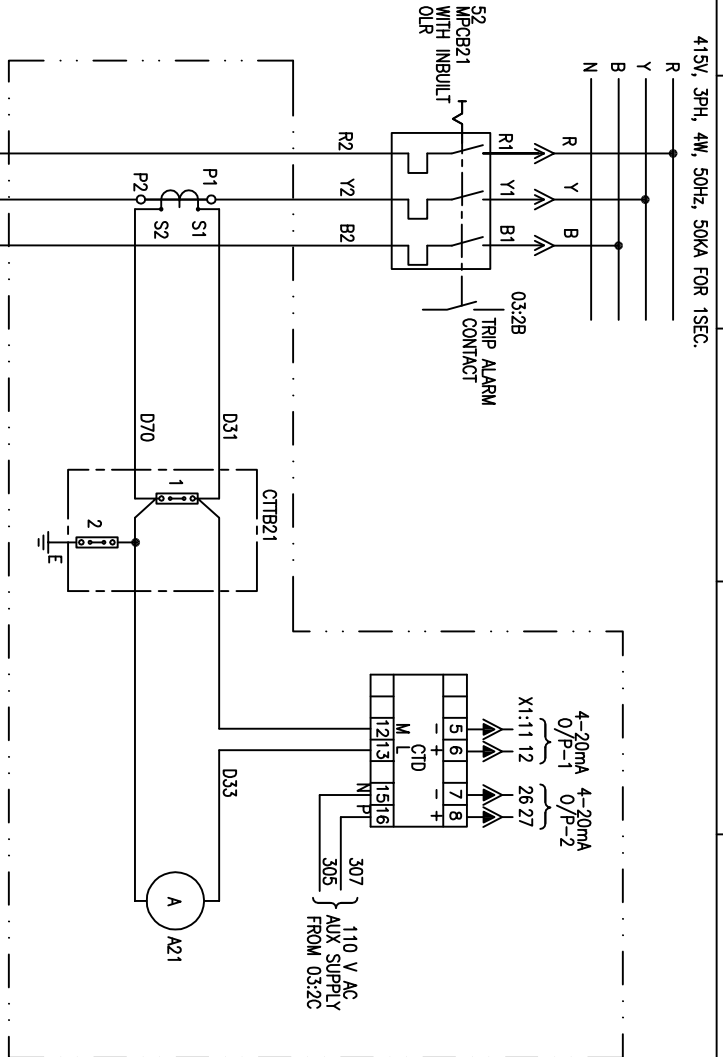
BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROPROCELS DIVISION BANGALORE  
POWER AND CONTROL SCHEME  
ESSENTIAL MOTOR FEEDER BELOW 30KW

DRG. NO. EP-3-CS-048-032

1 2 3 4 5 6 7 8

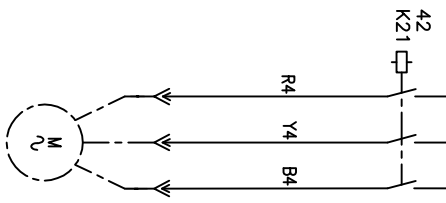
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



\*\* NOTE: THIS CIRCUIT IS APPLICABLE FOR SPECIFIC FEEDERS AS PER SLD

- POSITIONS OF DISCONNECTORS**
- ▲ MAKE CONTACT IN BOTH SERVICE & TEST POSITION
  - ▲ MAKE CONTACT IN TEST POSITION ONLY
  - ▲ MAKE CONTACT IN SERVICE POSITION ONLY



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-032	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH				05	02	01
2					DRAWN							
3					DESIGNED	JAGADISH						
4												



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWER DIVISION BANGALORE

TITLE :  
**POWER AND CONTROL SCHEME**  
ESSENTIAL MOTOR FEEDER BELOW 30KW



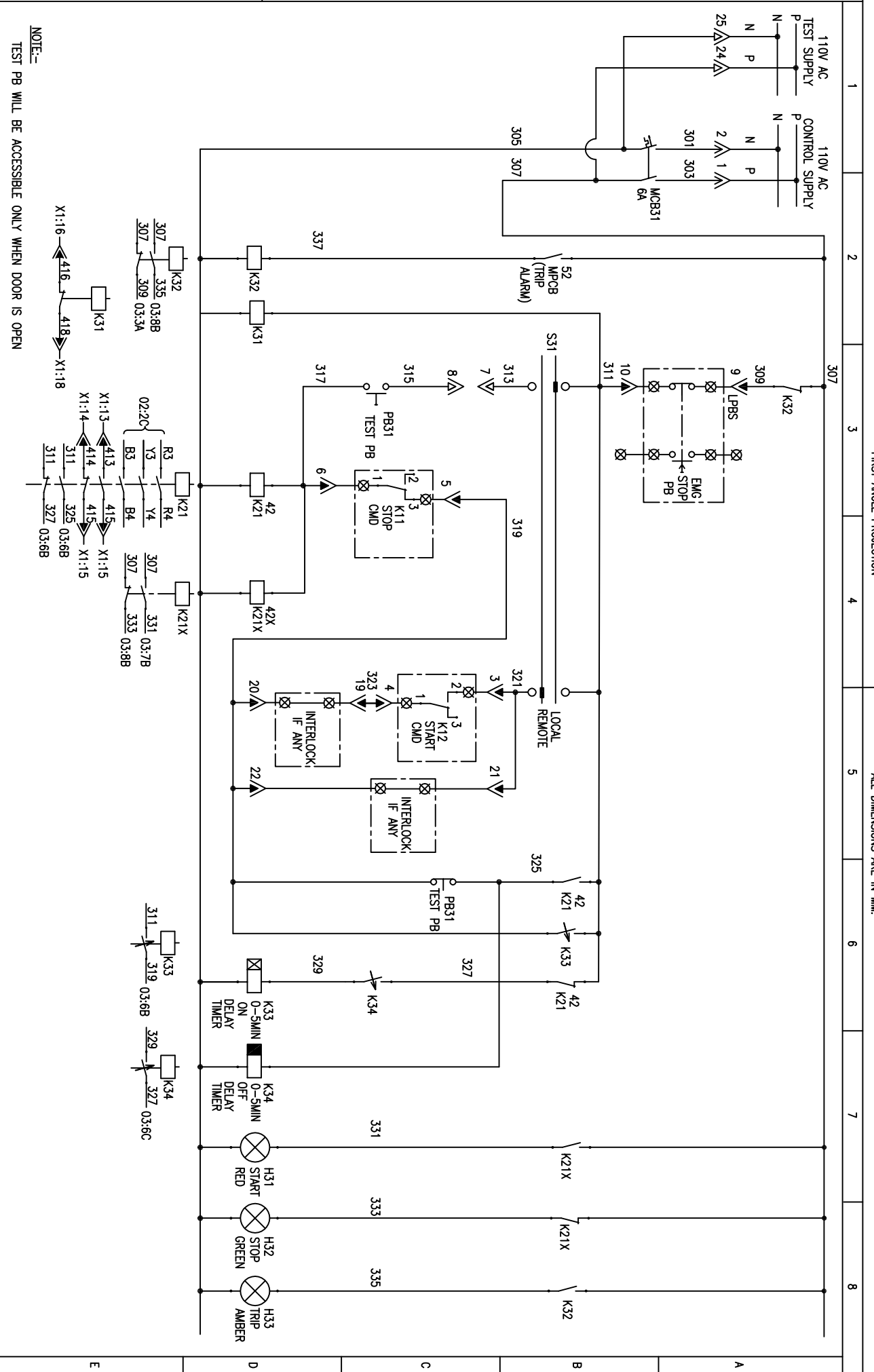
NO. OF SHEETS: 05  
SHEET NO.: 02

DRG. NO. EP-3-CS-048-032

FORM 66-271 A4

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



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

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-032	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH				05	03	01
2					DRAWN							
3					DESIGNED	JAGADISH						
4												



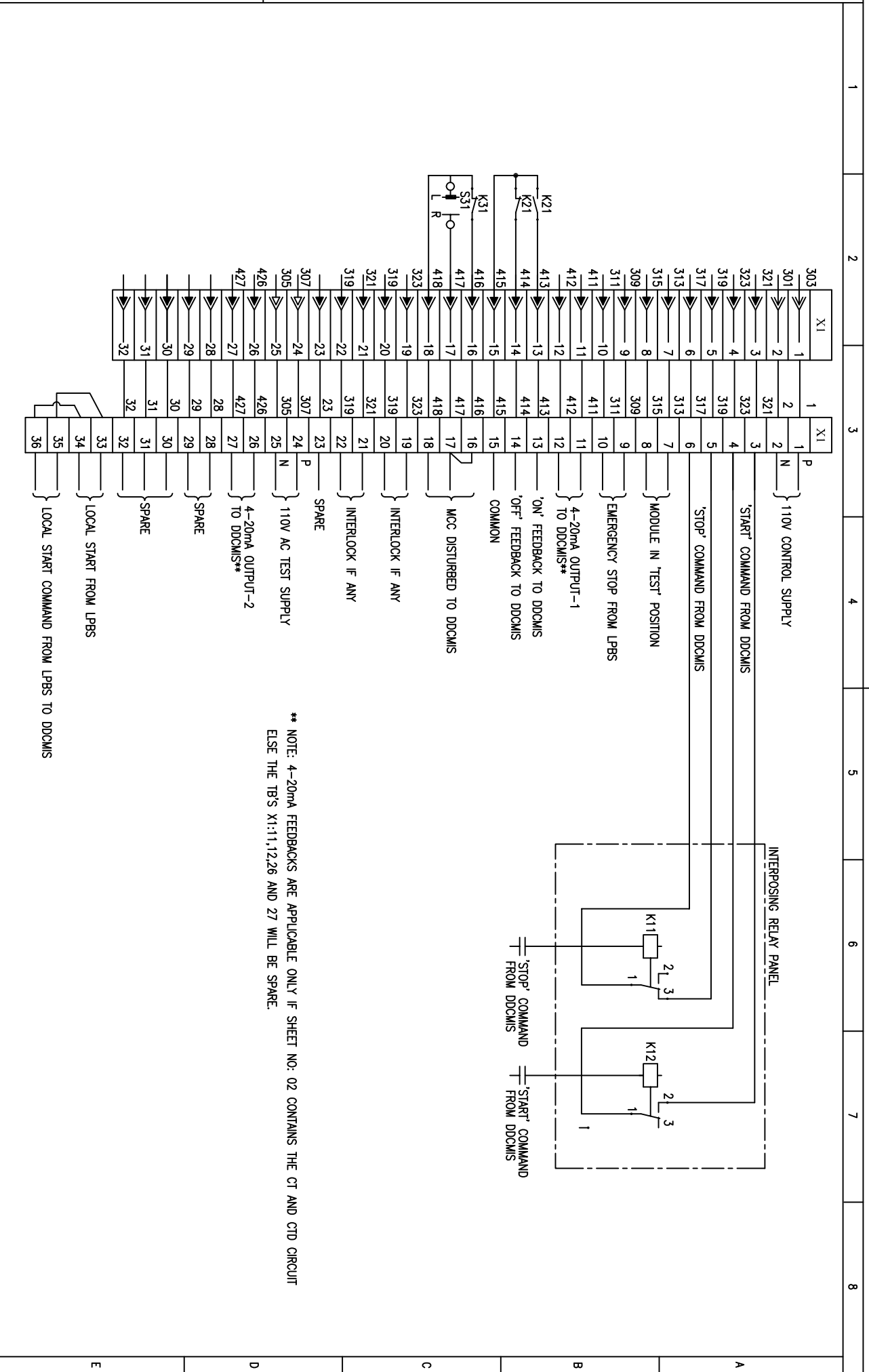
**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWER DIVISION BANGALORE

TITLE :  
**POWER AND CONTROL SCHEME**  
ESSENTIAL MOTOR FEEDER BELOW 30KW

NO. OF SHEETS	05
SHEET NO.	03
REV.	01

DRG. NO. EP-3-CS-048-032

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		19.04.16	NA	CP-14-048	EP-3-CS-048-032	05	04	01
2					DRAWN	JAGADISH		19.04.16						
3					DESIGNED	JAGADISH		19.04.16						
4														



\*\* NOTE: 4-20mA FEEDBACKS ARE APPLICABLE ONLY IF SHEET NO: 02 CONTAINS THE CI AND CTD CIRCUIT ELSE THE TBS X1:11,12,26 AND 27 WILL BE SPARE.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWER DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
ESSENTIAL MOTOR FEEDER BELOW 30KW



NO. OF SHEETS: 05  
SHEET NO.: 04

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DRG. NO. EP-3-CS-048-032

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTRACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		TIMED CLOSING CONTACT	
		OFF DELAY TIMER	
		TIMED OPENING CONTACT	
		ON DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		OFF DELAY TIMER	
		INSTANTANEOUS CLOSING CONT.	
		NORMALLY OPEN BUTTON PB	
		NORMALLY CLOSE BUTTON PB	
		MUSHROOM HEAD EMERGENCY STOP PB	
		SELECTOR SWITCH SS	
		POWER CONTACTOR	
		AUXILIARY CONTACTOR	
		MULTIPLICATION RELAY	
		LATCHED TYPE RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INDICATING LAMP	
		METER/RELAY	
		SELECTOR SWITCH	
		TRANSDUCER	
		EARTHING	
		3 PIN SOCKET WITH SWITCH	
		MOTOR	
		HEATER	
		INTERNALLY WIRED TERMINAL	
		OUTGOING TERMINAL	
		DRAWOUT/DISCONNECTOR	
		DIODE	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
AGB	AIR CIRCUIT BREAKER	25	SYNCHRONISM
MCB	MINIATURE CIRCUIT BREAKER	27	UNDER VOLTAGE
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MPCB	MOTOR PROTECTION CB	46	NEGATIVE SEQUENCE TIME OVER CURRENT
FSU	FUSE SWITCH UNIT	50	GROUND INSTANTANEOUS OVER CURRENT
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OLR	OVER LOAD RELAY	50N	NEUTRAL INSTANTANEOUS OVER CURRENT
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PT	POTENTIAL TRANSFORMER	51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
CTB	CT TESTING BOARD	52	BREAKER
F	FUSE	64R	RESTRICTED EARTH FAULT
NL	NEUTRAL LINK	74	TRIP CIRCUIT SUPERVISION
PS	POWER SOCKET	86	HAND RESET LOCKOUT RELAY
M	MOTOR	87	DIFFERENTIAL PROTECTION RELAY
E	EARTHING	94	ANTI PUMPING RELAY
CST	CONTROL SUPPLY TRANSFORMER	95	TRIP CIRCUIT SUPERVISION RELAY
A	AMMETER	97	FUSE MONITORING RELAY
V	VOLTMETER	98	COMPOSITE MOTOR PROTECTION RELAY
ASS	AMMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
VSS	VOLTMETER SELECTOR SWITCH		
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C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSDUCER		
VTD	VOLTAGE TRANSDUCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-3-CS-048-032
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		19.04.16				
2					DRAWN							
3					DESIGNED	JAGADISH		19.04.16				
4												

**BHARAT HEAVY ELECTRICALS LIMITED**  
 ELECTROPROTECTANS DIVISION BANGALORE

TITLE : POWER AND CONTROL SCHEME  
 ESSENTIAL MOTOR FEEDER BELOW 30KW

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA







CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

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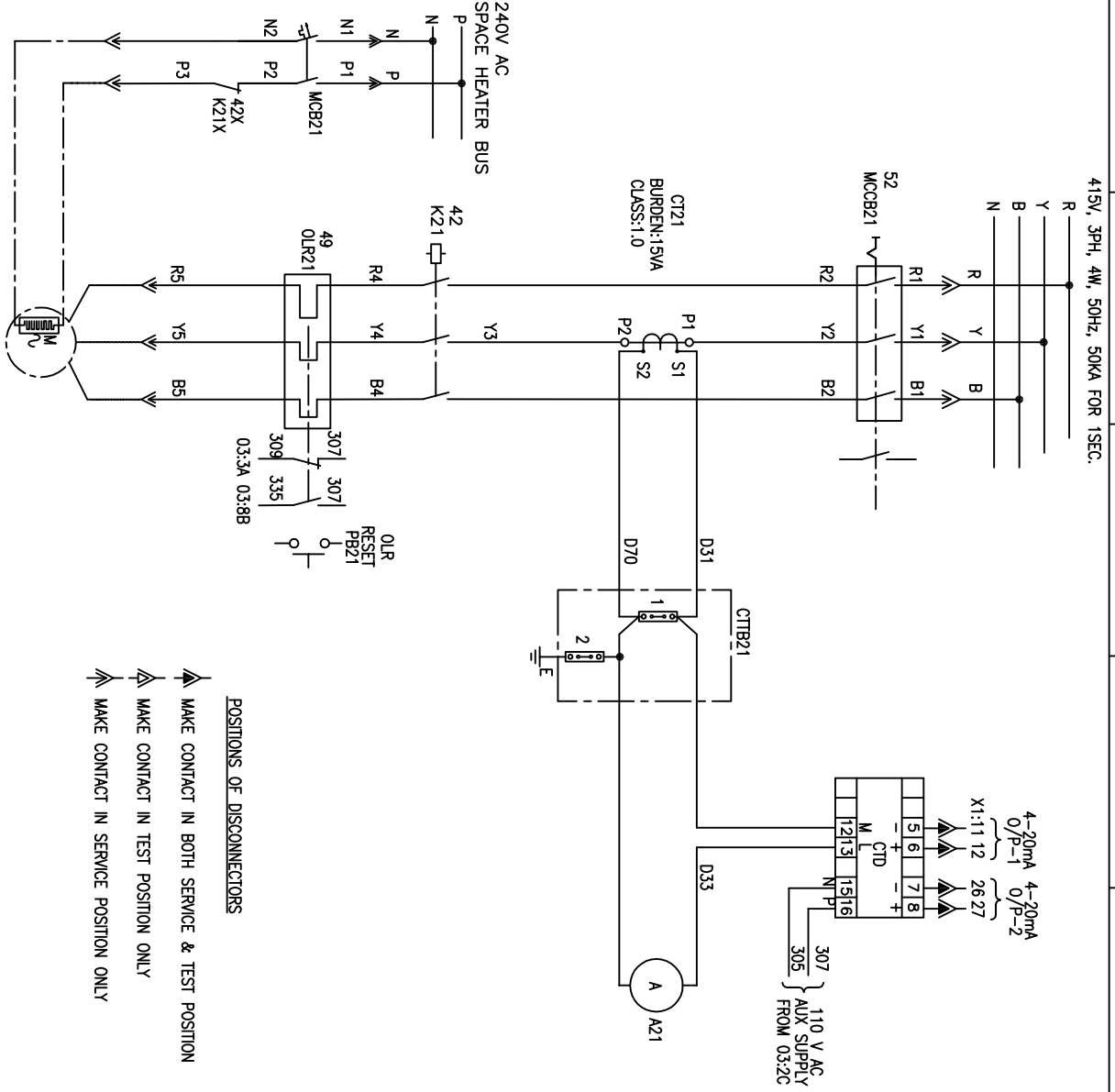
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DRG. NO. EP-4-CS-048-033

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-033	NO. OF SHEETS	NO. OF SHEETS	REV.	
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH KSB		19.03.16		BHARAT HEAVY ELECTRICALS LIMITED ELECTROFORCELANS DIVISION BANGALORE POWER AND CONTROL SCHEME ESSENTIAL MOTOR FEEDER ABOVE 30KW & UPTO 110KW		05	01	01	
2				DRAWN	JAGADISH		19.03.16								
3				DESIGNED	JAGADISH		19.03.16								
4															

DRG. NO. EP-4-CS-048-033



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-033	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH	19.03.16			05	02	01
2					DRAWN							
3					DESIGNED	JAGADISH	19.03.16					
4												



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERELANS DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
ESSENTIAL MOTOR FEEDER ABOVE 30KW & UPTO 110KW



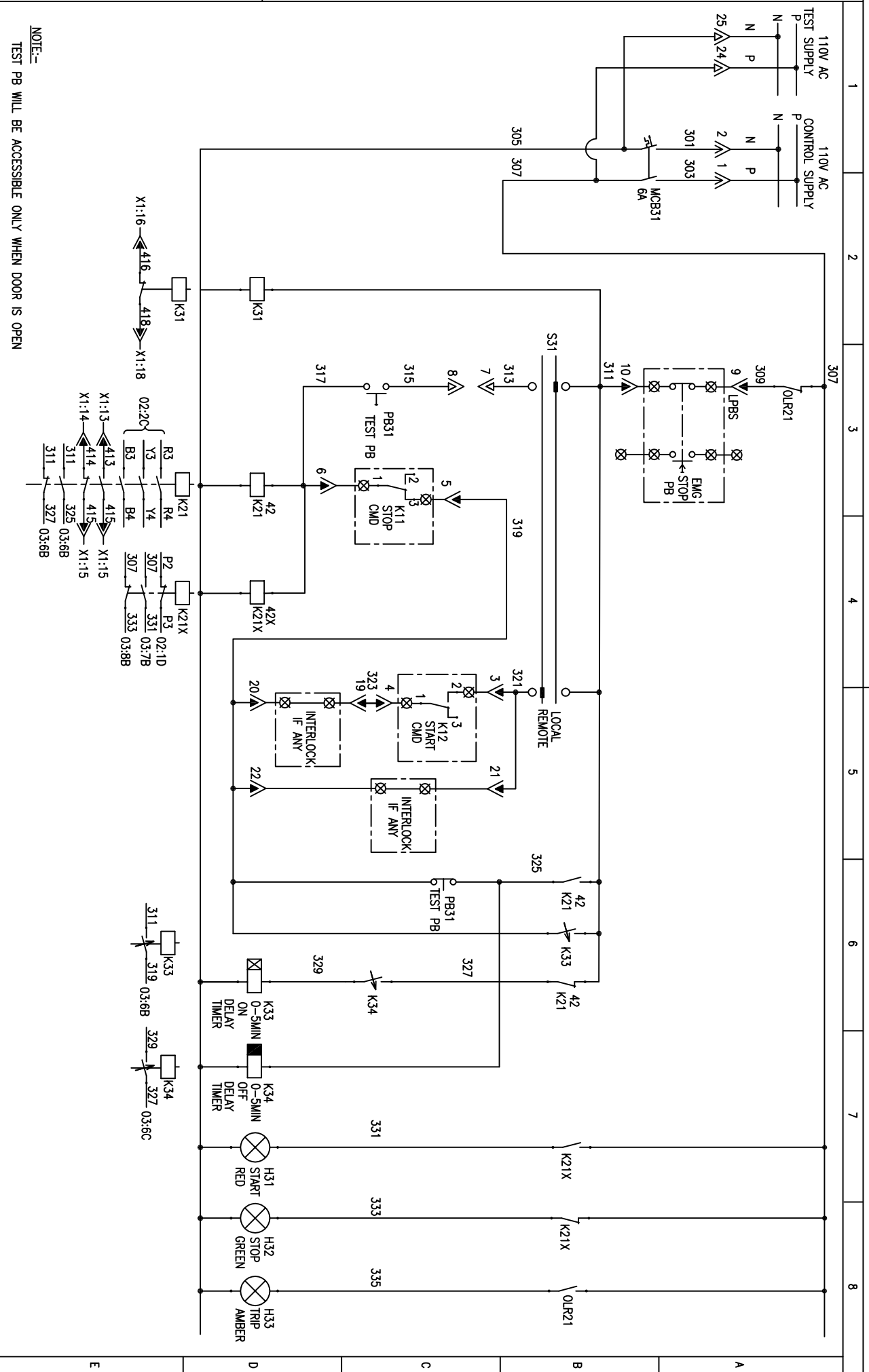
NO. OF SHEETS: 05  
SHEET NO.: 02

DRG. NO. EP-4-CS-048-033

FORM 66-271 A4

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-033	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH	19.03.16			05
2					DRAWN					03
3					DESIGNED	JAGADISH	19.03.16			01
4										

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

TITLE :  
POWER AND CONTROL SCHEME  
ESSENTIAL MOTOR FEEDER ABOVE 30KW & UPTO 110KW

NO. OF SHEETS: 05  
SHEET NO.: 03

NO. OF SHEETS: 05  
SHEET NO.: 03



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DRG. NO. EP-4-CS-048-033

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
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		POTENTIAL TRANSFORMER PT	
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		NEUTRAL LINK LK	
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		OFF DELAY TIMER	
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		MUSHROOM HEAD EMERGENCY STOP PB	
		SELECTOR SWITCH SS	
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		LATCHED TYPE RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INDICATING LAMP	
		METER/RELAY	
		SELECTOR SWITCH	
		TRANSDUCER	
		EARTHING	
		3 PIN SOCKET WITH SWITCH	
		MOTOR	
		HEATER	
		INTERNALLY WIRED TERMINAL	
		OUTGOING TERMINAL	
		DRAWOUT/DISCONNECTOR	
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D	DIODE BRIDGE		
CTD	CURRENT TRANSDUCER		
VTD	VOLTAGE TRANSDUCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	4	NAME	JAGADISH	DATE	19.05.15	SCALE	NA	JOB NO.	CP-14-048	DRG. NO.	EP-4-CS-048-033	
REV. NO.	1	DESCRIPTION	CHECKED	19.05.15				TITLE :	POWER AND CONTROL SCHEME	NO. OF SHEETS	05	
DATE	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16	DRAWN	19.05.15				ESSENTIAL MOTOR FEEDER ABOVE 30KW & UPTO 110KW	SHEET NO.	05	REV.	01
BY			APPD.									
APPROVED			KSB									



**BHARAT HEAVY ELECTRICALS LIMITED**  
 ELECTROPROTECTANS DIVISION BANGALORE



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DRG. NO. EP-4-CS-048-034

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:








TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

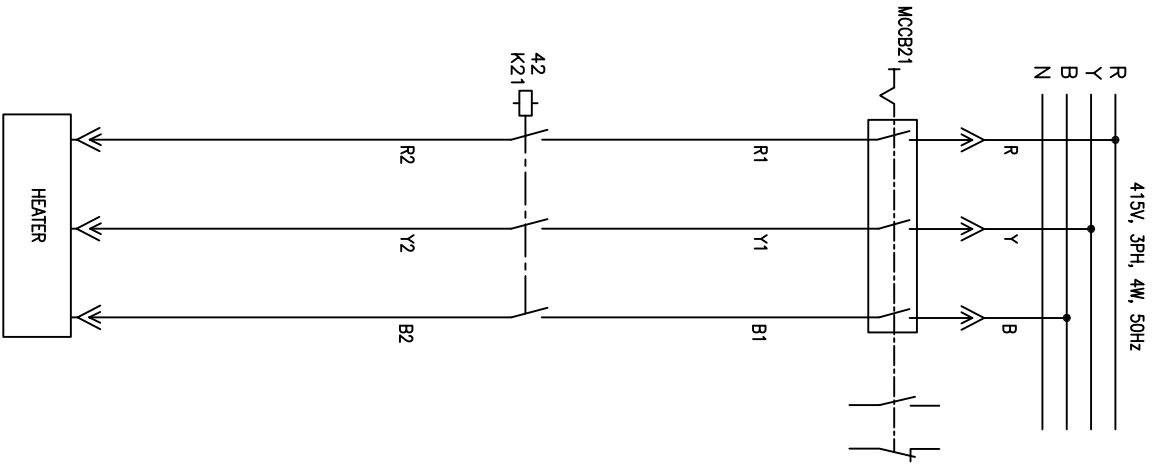
PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	TITLE :	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-034	NO. OF SHEETS	SHEET. NO.	REV.				
4											<b>BHARAT HEAVY ELECTRICALS LIMITED</b> ELECTROPOWERCELLS DIVISION BANGALORE 	SCHEME DIAGRAM FOR HEATER FEEDR (EAS)		05	01	E				
3					DESIGNED	JAGADISH		17.04.15											D	
2					DRAWN															
1	30.6.16		REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		17.04.15											

DRG. NO. EP-4-CS-048-034



POSITIONS OF DISCONNECTORS

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

FIRST ANGLE PROJECTION

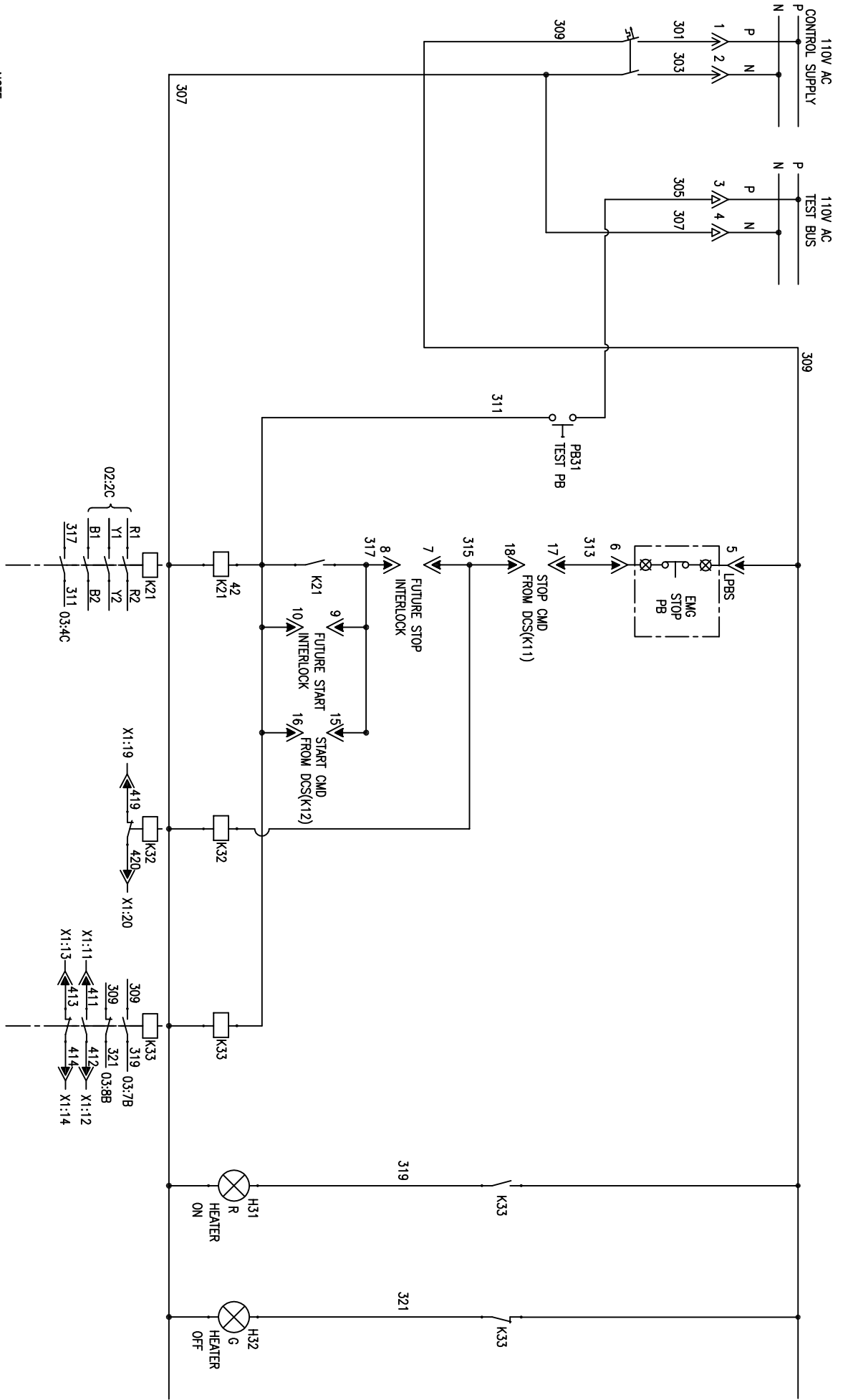
ALL DIMENSIONS ARE IN MM.

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-034	NO. OF SHEETS	SHEET NO.	REV.
4	1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		17.04.15				05	02	01
3	2					DRAWN	JAGADISH		17.04.15						
2															
1															



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

TITLE :  
SCHEME DIAGRAM FOR HEATER FEEDR (EAS)



NOTE:-  
TEST PB WILL BE ACCESSIBLE ONLY WHEN DOOR IS OPEN AND THE MODULE IS DRAWN-OUT TO TEST POSITION.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		19.03.16	NA	CP-14-048	EP-4-CS-048-034	05	03	01
2					DRAWN	JAGADISH		19.03.16						
3					DESIGNED	JAGADISH		19.03.16						
4														



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERELANS DIVISION BANGALORE

TITLE :  
SCHEME DIAGRAM FOR HEATER FEEDR (EA3)

NO. OF SHEETS	05
SHEET NO.	03
REV.	01

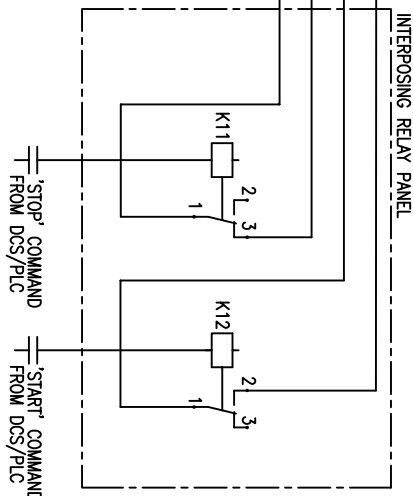
DRG. NO. EP-4-CS-048-034

FORM 66-271 A4

FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM

1	X1	
2	1	P
3	2	N
4	3	P
5	4	N
6	5	
7	6	
8	7	
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10	9	
11	10	
12	11	
13	12	
14	13	
15	14	
16	15	
17	16	
18	17	
19	18	
20	19	
21	20	
22	21	
23	22	
24	23	

110V AC CONTROL BUS  
110 V AC TEST BUS  
LOCAL STOP (EMR STOP)  
FUTURE STOP INTERLOCK  
FUTURE START INTERLOCK  
HEATER 'ON'  
HEATER 'OFF'  
FEEDBACK TO DDCMS/PLC/ATRS  
START COMMAND FROM DCS/PLC  
STOP COMMAND FROM DCS/PLC  
MODULE DISTURBED  
SPARE TERMINALS



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	NO. OF SHEET	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		17.04.15	MA	CP-14-048	EP-4-CS-048-034	05	04	01
2					DRAWN	JAGADISH		17.04.15						
3					DESIGNED	JAGADISH		17.04.15						
4														



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

TITLE :  
SCHEME DIAGRAM FOR HEATER FEEDR (EAS)



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DRG. NO. EP-4-CS-048-034

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER	
		MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB	
		MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB	
		MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU	
		POWER CONTRACTOR Q	
		MINIATURE CIRCUIT BREAKER	
		OVER LOAD RELAY OLR	
		CURRENT TRANSFORMER CT	
		POTENTIAL TRANSFORMER PT	
		HRC FUSE F	
		NEUTRAL LINK LK	
		BUSDUCT	
		NORMALLY OPEN CONTACT	
		NORMALLY CLOSE CONTACT	
		CHANGE OVER CONTACT	
		THERMAL OVER LOAD RELAY	
		ON DELAY TIMER	
		TIMED CLOSING CONTACT	
		OFF DELAY TIMER	
		TIMED OPENING CONTACT	
		ON DELAY TIMER	
		INSTANTANEOUS CLOSE DELAYED OPENING CONT.	
		OFF DELAY TIMER	
		INSTANTANEOUS OPEN DELAYED CLOSING CONT.	
		NORMALLY OPEN BUTTON PB	
		NORMALLY CLOSE BUTTON PB	
		MUSHROOM HEAD EMERGENCY STOP PB	
		SELECTOR SWITCH SS	
		POWER CONTACTOR	
		AUXILIARY CONTACTOR	
		MULTIPLICATION RELAY	
		LATCHED TYPE RELAY	
		ON DELAY TIMER	
		OFF DELAY TIMER	
		INDICATING LAMP	
		METER/RELAY	
		SELECTOR SWITCH	
		TRANSDUCER	
		EARTHING	
		3 PIN SOCKET WITH SWITCH	
		MOTOR	
		HEATER	
		INTERNALLY WIRED TERMINAL	
		OUTGOING TERMINAL	
		DRAWOUT/DISCONNECTOR	
		DIODE	

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
AGB	AIR CIRCUIT BREAKER	25	SYNCHRONISM
MCB	MINIATURE CIRCUIT BREAKER	27	UNDER VOLTAGE
MCCB	MOULDED CASE CIRCUIT BREAKER	30&48	TRIP CIRCUIT ANNUNCIATION
MPCB	MOTOR PROTECTION CB	46	NEGATIVE SEQUENCE TIME OVER CURRENT
FSU	FUSE SWITCH UNIT	50	GROUND INSTANTANEOUS OVER CURRENT
IS	ISOLATOR	50BF	BREAKER FAILURE
OLR	OVER LOAD RELAY	50N	NEUTRAL INSTANTANEOUS OVER CURRENT
CT	CURRENT TRANSFORMER	51	IDMT OVER CURRENT PROTECTION RELAY
PT	POTENTIAL TRANSFORMER	51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
CTB	CT TESTING BOARD	52	BREAKER
F	FUSE	64R	RESTRICTED EARTH FAULT
NL	NEUTRAL LINK	74	TRIP CIRCUIT SUPERVISION
PS	POWER SOCKET	86	HAND RESET LOCKOUT RELAY
M	MOTOR	87	DIFFERENTIAL PROTECTION RELAY
E	EARTHING	94	ANTI PUMPING RELAY
CST	CONTROL SUPPLY TRANSFORMER	95	TRIP CIRCUIT SUPERVISION RELAY
A	AMMETER	97	FUSE MONITORING RELAY
V	VOLTMETER	98	COMPOSITE MOTOR PROTECTION RELAY
ASS	AMMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
VSS	VOLTMETER SELECTOR SWITCH		
W	WATT METER		
WH	WATT HOUR METER		
KWH	KILO WATT HOUR METER		
PF	POWER FACTOR METER		
MFM	MULTI FUNCTION METER		
H	INDICATING LAMP		
NR	NUMERICAL RELAY		
SS	SELECTOR SWITCH		
C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSDUCER		
VTD	VOLTAGE TRANSDUCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-034
4												
3							JAGADISH		19.05.15			
2							JAGADISH		19.05.15			
1		30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16				JAGADISH		19.05.15			

BHARAT HEAVY ELECTRICALS LIMITED  
ELECTRONICRELAYS DIVISION BANGALORE

TITLE : SCHEME DIAGRAM FOR HEATER FEEDR (FA3)

NO. OF SHEETS	SHEET NO.	REV.
05	05	01

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA







CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

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DRG. NO. EP-4-CS-048-035

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	CHECKED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-035	NO. OF SHEETS	NO. OF SHEETS	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		17.04.15				03	01	01
2					DRAWN	JAGADISH		17.04.15						
3					DESIGNED	JAGADISH		17.04.15						
4														

BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE

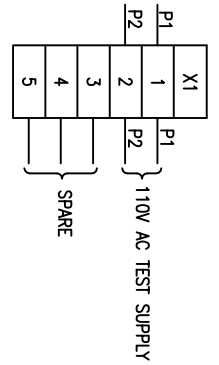
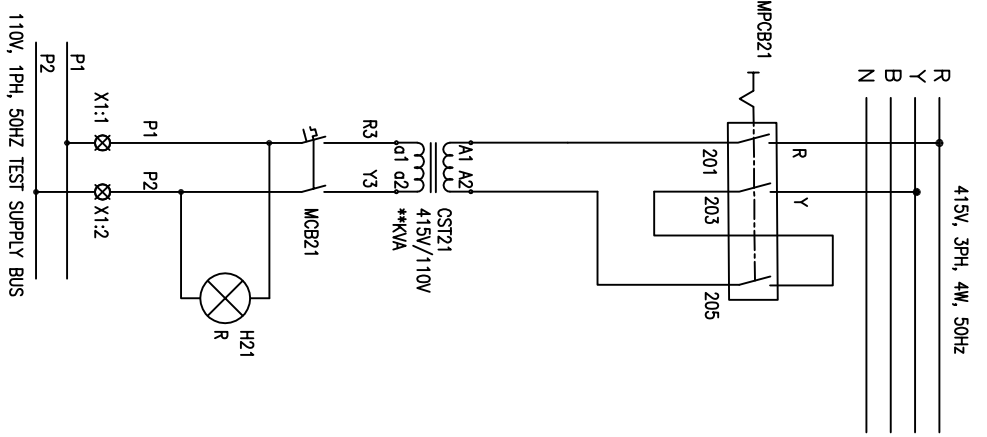
TEST SUPPLY MODULE

TITLE :

DRG. NO. EP-4-CS-048-035

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



NOTE : \*\*RATING SHALL BE SAME AS CST OF SWITCHBOARD

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-035	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		17.04.15				03	02	01
2					DRAWN	JAGADISH		17.04.15						
3					DESIGNED	JAGADISH		17.04.15						
4														

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

TEST SUPPLY MODULE



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DRG. NO. EP-4-CS-048-035

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT POWER CONTRACTOR MINIATURE CIRCUIT BREAKER OVER LOAD RELAY CURRENT TRANSFORMER POTENTIAL TRANSFORMER HRC FUSE NEUTRAL LINK BUSDUCT	NORMALLY OPEN CONTACT NORMALLY CLOSE CONTACT CHANGE OVER CONTACT THERMAL OVER LOAD RELAY CLOSE CONTACT OFF DELAY TIMER ON DELAY TIMER TIMED CLOSING CONTACT TIMED OPENING CONTACT ON DELAY TIMER INSTANTANEOUS CLOSE DELAYED OPENING CONT. OFF DELAY TIMER INSTANTANEOUS OPEN DELAYED CLOSING CONT. 3 PIN SOCKET WITH SWITCH EARTHING TRANSUDGER SELECTOR SWITCH METER/RELAY INDICATING LAMP OFF DELAY TIMER ON DELAY TIMER MULTIPLICATION RELAY LATCHED TYPE RELAY AUXILIARY CONTACTOR POWER CONTACTOR
		HEATER MOTOR INTERNALLY WIRED TERMINAL OUTGOING TERMINAL DIODE SPACE HEATER	HEATER MOTOR INTERNALLY WIRED TERMINAL OUTGOING TERMINAL DIODE SPACE HEATER

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
AGB	AIR CIRCUIT BREAKER	25	SYNCHRONISM
MCB	MINIATURE CIRCUIT BREAKER	27	UNDER VOLTAGE
MCCB	MOULDED CASE CIRCUIT BREAKER	30&48	TRIP CIRCUIT ANNUNCIATION
MPCB	MOTOR PROTECTION CB	46	NEGATIVE SEQUENCE TIME OVER CURRENT
FSU	FUSE SWITCH UNIT	50	GROUND INSTANTANEOUS OVER CURRENT
IS	ISOLATOR	50BF	BREAKER FAILURE
OLR	OVER LOAD RELAY	50N	NEUTRAL INSTANTANEOUS OVER CURRENT
CT	CURRENT TRANSFORMER	51	IDMT OVER CURRENT PROTECTION RELAY
PT	POTENTIAL TRANSFORMER	51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
CTB	CT TESTING BOARD	52	BREAKER
F	FUSE	64R	RESTRICTED EARTH FAULT
NL	NEUTRAL LINK	74	TRIP CIRCUIT SUPERVISION
PS	POWER SOCKET	86	HAND RESET LOCKOUT RELAY
M	MOTOR	87	DIFFERENTIAL PROTECTION RELAY
E	EARTHING	94	ANTI PUMPING RELAY
CST	CONTROL SUPPLY TRANSFORMER	95	TRIP CIRCUIT SUPERVISION RELAY
A	AMMETER	97	FUSE MONITORING RELAY
V	VOLTMETER	98	COMPOSITE MOTOR PROTECTION RELAY
ASS	AMMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
VSS	VOLTMETER SELECTOR SWITCH		
W	WATT METER		
WH	WATT HOUR METER		
KWH	KILO WATT HOUR METER		
PF	POWER FACTOR METER		
MFM	MULTI FUNCTION METER		
H	INDICATING LAMP		
NR	NUMERICAL RELAY		
SS	SELECTOR SWITCH		
C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSUDGER		
VTD	VOLTAGE TRANSUDGER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	1	2	3	4
REV. NO.	30.6.16			
DATE	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			
DESCRIPTION				
BY				
APPD.				
APPROVED				
CHECKED				
DRAWN				
NAME	JAGADISH	JAGADISH	JAGADISH	JAGADISH
SIGN.				
DATE	19.05.15	19.05.15	19.05.15	19.05.15
SCALE	NA			
JOB NO.	CP-14-048			
DRG. NO.	EP-4-CS-048-035			
TITLE	BHARAT HEAVY ELECTRICALS LIMITED ELECTRONPROCELIANS DIVISION BANGALORE			
TEST SUPPLY MODULE				
NO. OF SHEETS	03			
SHEET NO.	03			
REV. NO.	01			

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA







CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

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DRG. NO. EP-4-CS-048-036

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	CHECKED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-036	NO. OF SHEETS	SHEET NO.	REV.
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED	JAGADISH		17.04.15				03	01	01
2					DRAWN	JAGADISH		17.04.15						
3					DESIGNED	JAGADISH		17.04.15						
4														

BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE

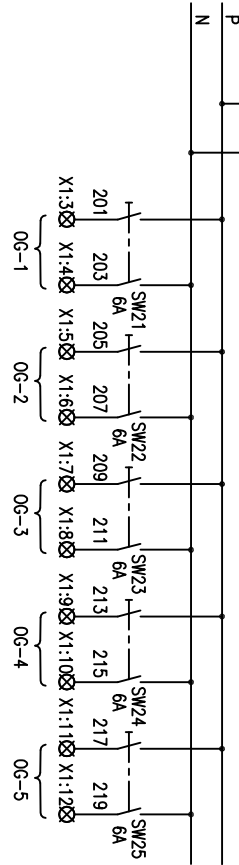
ESSENTIAL SUPPLY MODULE

DRG. NO. EP-4-CS-048-036

FORM 66-271 A4

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



INVENTORY NO.	1	2	3	4	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-036	NO. OF SHEETS	03
REV. NO.	1				JAGADISH		17.04.15				SHEETS	02
DATE	30.6.16				KSB		17.04.15				NO.	01
DESCRIPTION	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16											
BY	[Signature]											
APPD.	[Signature]											
CHECKED	[Signature]											
APPROVED	[Signature]											
DESIGNED	[Signature]											
DRAWN	[Signature]											
<b>BHARAT HEAVY ELECTRICALS LIMITED</b> ELECTROFORCELANS DIVISION BANGALORE												
TITLE : ESSENTIAL SUPPLY MODULE												

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DRG. NO. EP-4-CS-048-036

THREE LINE DIAGRAM SYMBOLS	SINGLE LINE DIAGRAM SYMBOLS	DESCRIPTION	SINGLE LINE DIAGRAM & CONTROL SCHEME
		MOTOR OPERATED DRAWOUT TYPE AIR CIRCUIT BREAKER MANUALLY OPERATED MOULDED CASE CIRCUIT BREAKER MCCB MANUALLY OPERATED MOTOR PROTECTION CIRCUIT BREAKER MPCB MANUALLY OPERATED DRAWOUT TYPE FUSE SWITCH UNIT FSU POWER CONTRACTOR Q MINATURE CIRCUIT BREAKER OVER LOAD RELAY OLR CURRENT TRANSFORMER CT POTENTIAL TRANSFORMER PT HRC FUSE F NEUTRAL LINK LK BUSDUCT	NORMALLY OPEN CONTACT NORMALLY CLOSE CONTACT CHANGE OVER CONTACT THERMAL OVER LOAD RELAY CLOSE CONTACT ON DELAY TIMER ON DELAY TIMER TIMED CLOSING CONTACT OFF DELAY TIMER OFF DELAY TIMER TIMED OPENING CONTACT ON DELAY TIMER INSTANTANEOUS CLOSE DELAYED OPENING CONT. OFF DELAY TIMER INSTANTANEOUS OPEN DELAYED CLOSING CONT. NORMALLY OPEN BUTTON PB NORMALLY CLOSE BUTTON PB MUSHROOM HEAD EMERGENCY STOP PB SELECTOR SWITCH SS
			POWER CONTACTOR AUXILIARY CONTACTOR MULTIPLICATION RELAY LATCHED TYPE RELAY ON DELAY TIMER OFF DELAY TIMER INDICATING LAMP METER/RELAY SELECTOR SWITCH TRANSUDCER EARTHING 3 PIN SOCKET WITH SWITCH HEATER MOTOR INTERNALLY WIRED TERMINAL OUTGOING TERMINAL DRAWOUT/DISCONNECTOR DIODE

LETTER SYMBOL	DESCRIPTION OF ELECTRICAL COMPONENTS	CODE	PROTECTIVE RELAY DESCRIPTION
AGB	AIR CIRCUIT BREAKER	25	SYNCHRONISM
MCB	MINATURE CIRCUIT BREAKER	27	UNDER VOLTAGE
MCCB	MOULDED CASE CIRCUIT BREAKER	30&48	TRIP CIRCUIT ANNUNCIATION
MPCB	MOTOR PROTECTION CB	46	NEGATIVE SEQUENCE TIME OVER CURRENT
FSU	FUSE SWITCH UNIT	50	GROUND INSTANTANEOUS OVER CURRENT
IS	ISOLATOR	50BF	BREAKER FAILURE
OLR	OVER LOAD RELAY	50N	NEUTRAL INSTANTANEOUS OVER CURRENT
CT	CURRENT TRANSFORMER	51	IDMT OVER CURRENT PROTECTION RELAY
PT	POTENTIAL TRANSFORMER	51N	INVERSE TIME EARTH FAULT PROTECTION RELAY
CTB	CT TESTING BOARD	52	BREAKER
F	FUSE	64R	RESTRICTED EARTH FAULT
NL	NEUTRAL LINK	74	TRIP CIRCUIT SUPERVISION
PS	POWER SOCKET	86	HAND RESET LOCKOUT RELAY
M	MOTOR	87	DIFFERENTIAL PROTECTION RELAY
E	EARTHING	94	ANTI PUMPING RELAY
CST	CONTROL SUPPLY TRANSFORMER	95	TRIP CIRCUIT SUPERVISION RELAY
A	AMMETER	97	FUSE MONITORING RELAY
V	VOLTMETER	98	COMPOSITE MOTOR PROTECTION RELAY
ASS	AMMETER SELECTOR SWITCH	99	FUSE FAILURE RELAY
VSS	VOLTMETER SELECTOR SWITCH		
W	WATT METER		
WH	WATT HOUR METER		
KWH	KILO WATT HOUR METER		
PF	POWER FACTOR METER		
MFM	MULTI FUNCTION METER		
H	INDICATING LAMP		
NR	NUMERICAL RELAY		
SS	SELECTOR SWITCH		
C	POWER CONTACTOR		
K	AUXILIARY CONTACTOR		
PB	PUSH BUTTON		
D	DIODE BRIDGE		
CTD	CURRENT TRANSUDCER		
VTD	VOLTAGE TRANSUDCER		
TH	THERMOSTAT		
SH	SPACE HEATER		

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-036
1	30.6.16	REVISED AS PER CUSTOMER LETTER NO 1703 DTD 15.06.16			CHECKED		JAGADISH		19.05.15			
2					DRAWN		JAGADISH		19.05.15			
3					DESIGNED		JAGADISH		19.05.15			
4												

BHARAT HEAVY ELECTRICALS LIMITED  
 ELECTRONPROCELAN'S DIVISION BANGALORE

ESSENTIAL SUPPLY MODULE

TITLE :  
 NO. OF SHEETS : 03  
 SHEET NO. : 03

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DRG. NO. EP-4-CS-048-037

1	2	3	4	5	6	7	8
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FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



CUSTOMER:

TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

Sl No	SWITCHBOARD DESCRIPTION	DESIGN	RATING
1	415V UNIT BOILER ACDB	1HB	630A
2	415V UNIT SERVICE ACDB	10A	630A
3	415V AIR CONDITIONING MCC	07A	1000A
4	415V COMPRESSOR MCC	05H	1000A
5	415V MISC SERVICES MCC	00A	630A
6	415V VENTILATION MCC	17A	1000A
7	415V RAW WATER INTAKE PH PMCC	001	630A
8	415V SERVICE BUILDING MCC	05G	1000A
9	415V DM PLANT MCC	05A	630A
10	415V CPU MCC	05B	630A
11	415V FUEL OIL SERVICE PH PMCC	00G	1600A

CUSTOMER CONSULTANT:  
 DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-037	NO. OF SHEETS	SHEET NO.	REV.
4													10	01	00
3						DESIGNED	JAGADISH		11.07.16						
2						DRAWN									
1						CHECKED	JAGADISH		11.07.16						



BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE  
TITLE :  
POWER & CONTROL SCHEME  
INCOMER-A TO MCC CONTROLLED FROM DDCMIS ONLY

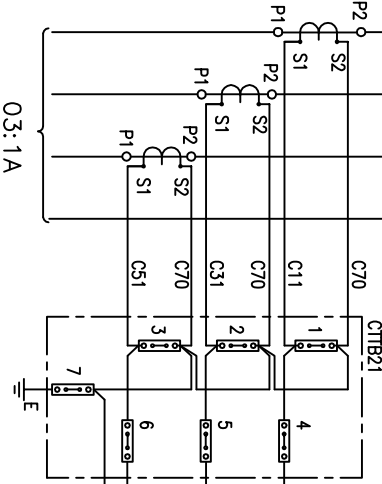


DRG. NO. EP-4-CS-048-037

\*\* - AS PER RATING  
OF THE SWITCHBOARD

03:1A

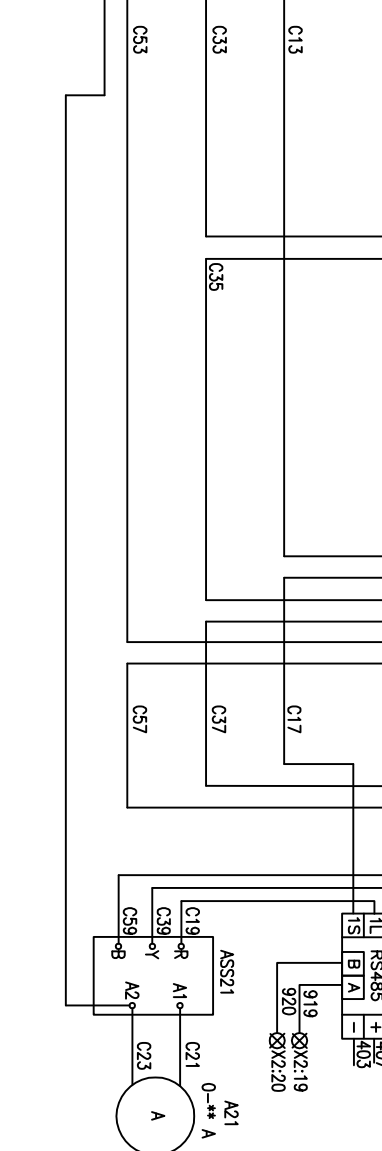
CT21-23  
RATIO : \*\*/1A  
BURDEN:1:5VA  
CLASS:0.5



4-20mA 0/P-1	33	34
4-20mA 0/P-2	5	6
	7	8
	12	13
	15	16

03:5E	1	2	3	4	5	6	7	8
	9	10	11	12	13	14	15	16
	17	18	19	20	21	22	23	24
	25	26	27	28	29	30	31	32

925	926	937	938
X2:25	X2:26	X2:37	X2:38
4-20mA	0/P-1	4-20mA	0/P-2



415V, 3PH, 4W, BUS, 50HZ, SOKA FOR 1SEC.

04:2C  
04:3D  
05:1D  
05:2D  
04:3D  
04:4C  
07:2B  
07:1B  
09:1A  
09:1A  
06:3B  
06:4B

03:5E  
03:5E  
03:5E

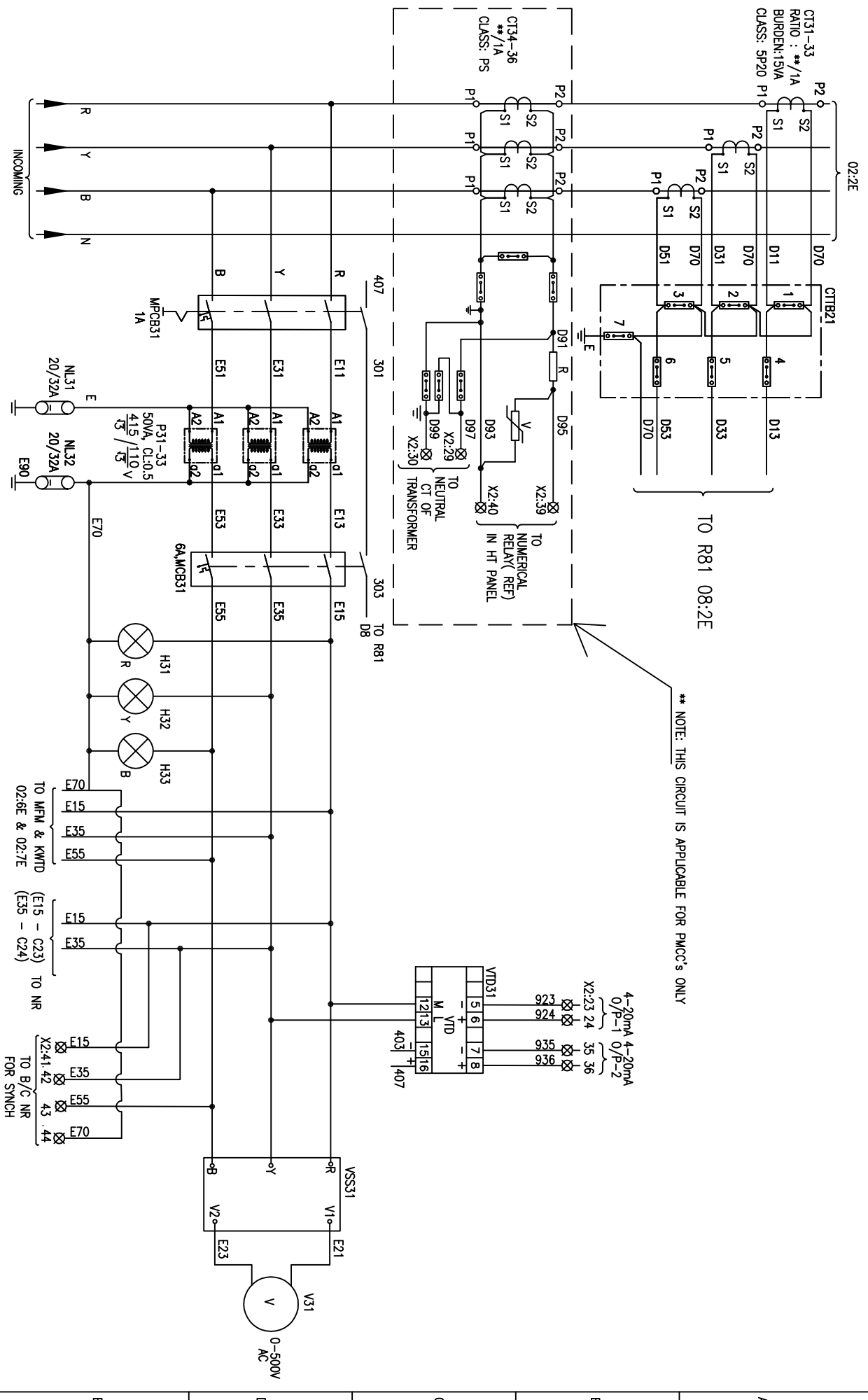
0-\*\*\* A

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

INVENTORY NO.	4	3	2	1
REV. NO.	1	2		
DATE				
DESCRIPTION				
BY				
APPD.				
APPROVED				
KSB				
11.07.16				
SCALE: NA				
JOB NO. CP-14-048				
DRG. NO. EP-4-CS-048-037				
<b>BHARAT HEAVY ELECTRICALS LIMITED</b> ELECTROPOWERCELLS DIVISION BANGALORE				
TITLE : <b>POWER &amp; CONTROL SCHEME</b> INCOMER-A TO MCC CONTROLLED FROM DDCMIS ONLY				
NO. OF SHEETS	10			
SHEET NO.	02			
REV.	00			

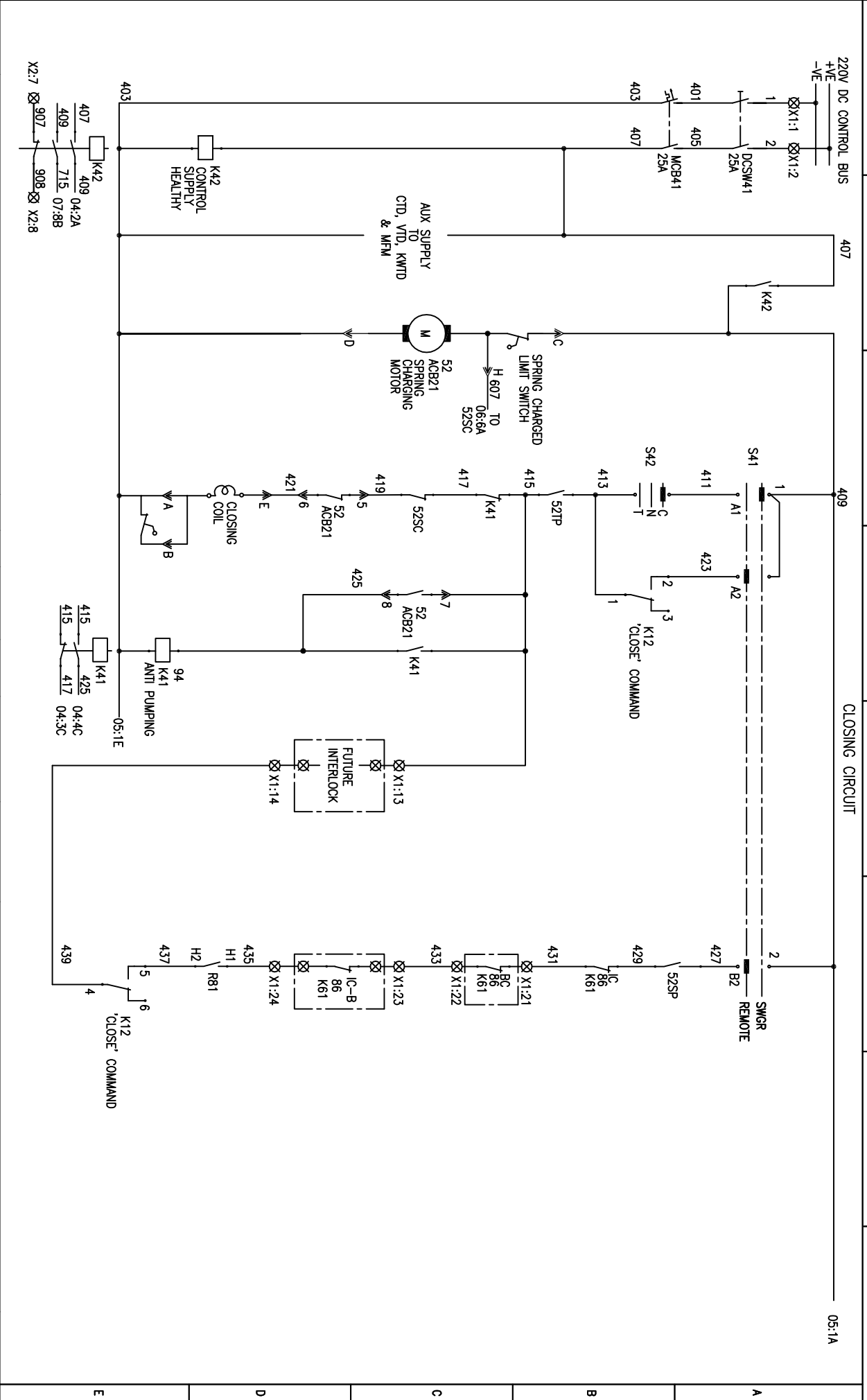
DRG. NO. EP-4-CS-048-037



\*\* NOTE: THIS CIRCUIT IS APPLICABLE FOR PMCC'S ONLY

INVENTORY NO.	4	NAME		DATE		SCALE	NA	JOB NO.	CP-14-048	DRG. NO.	EP-4-CS-048-037
REV. NO.	1	DESIGNED	JAGADISH	11.07.16							
	2	DRAWN									
	3	CHECKED	JAGADISH	11.07.16							
	4	BY	KSB	11.07.16							
DESCRIPTION	POWER & CONTROL SCHEME INCOMER-A TO MCC CONTROLLED FROM DDCMIS ONLY										
NO. OF SHEETS	10										
SHEET NO.	03										
REV.	00										

DRG. NO. EP-4-CS-048-037



FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM  
CLOSING CIRCUIT  
05:1A

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-037	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH				10	04	00
2					DRAWN							
3					DESIGNED	JAGADISH						
4												

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
INCOMER-A TO MCC CONTROLLED FROM DDCMIS ONLY



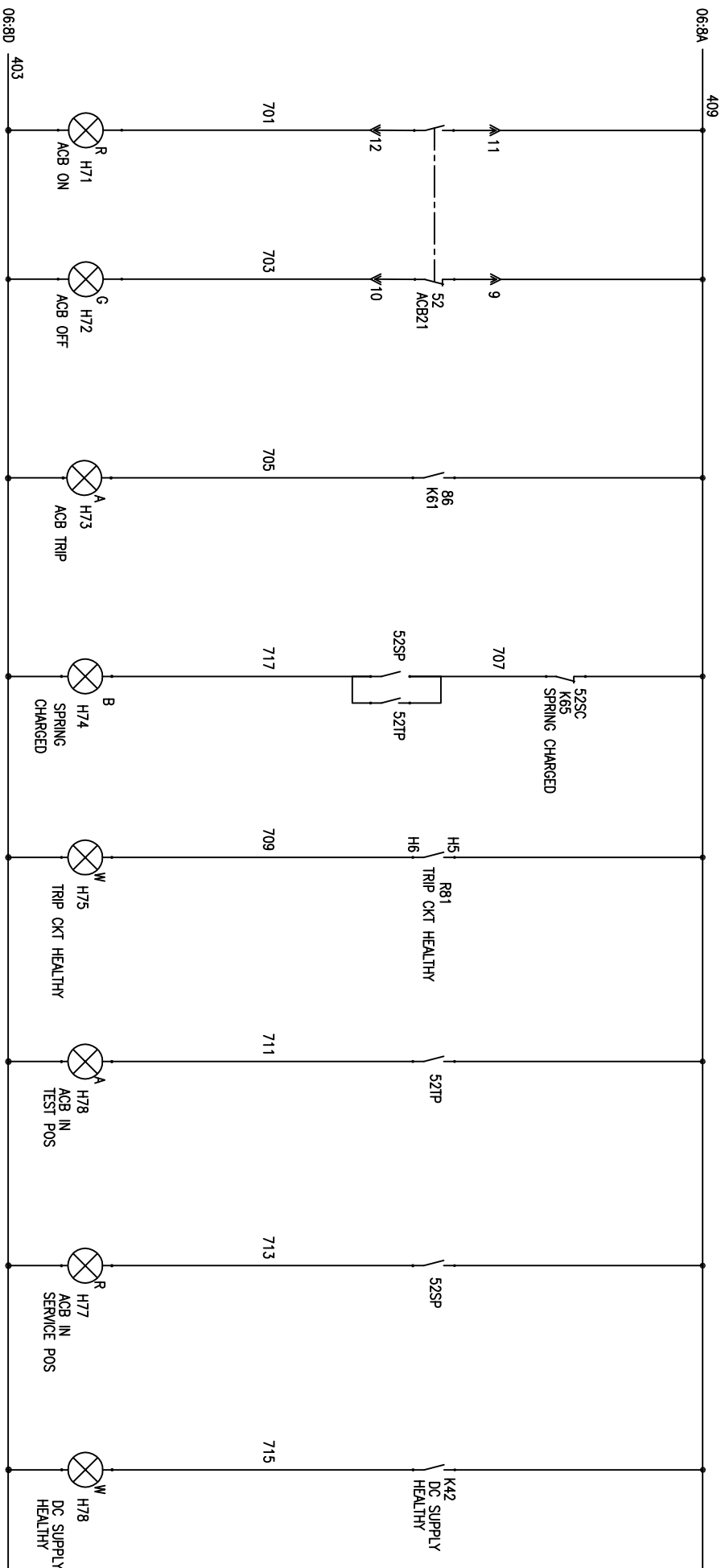




FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

INDICATION CIRCUIT



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DRG. NO. EP-4-CS-048-037

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE
1					CHECKED	JAGADISH		11.07.16
2					DRAWN			
3					DESIGNED	JAGADISH		11.07.16
4								



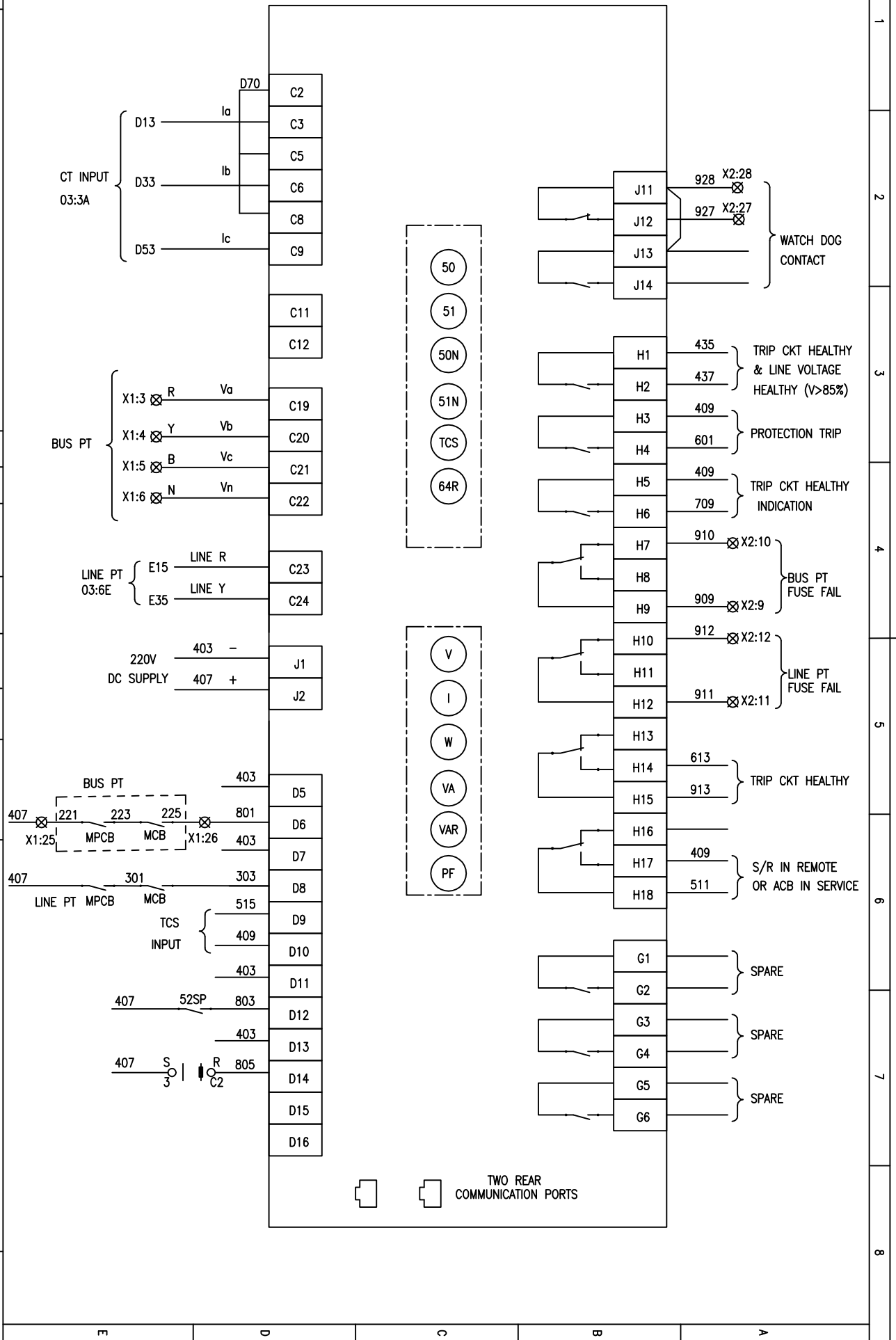
**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

TITLE :  
**POWER & CONTROL SCHEME**  
INCOMER-A TO MCC CONTROLLED FROM DDCCMS ONLY

NO. OF SHEETS	10
SHEET NO.	07
REV.	00

INVENTORY NO.				DRG. NO. EP-4-CS-048-037			
REV. NO.	1	2	3	4	DATE	DESCRIPTION	BY
APPD.							
APPROVED	CHECKED	DRAWN	DESIGNED				
KSB	JAGADISH		JAGADISH				
11.07.16	11.07.16		11.07.16				
SCALE: NA	BHARAT HEAVY ELECTRICALS LIMITED ELECTRONIC RELAYS DIVISION BANGALORE						
JOB NO. CP-14-048	TITLE: POWER & CONTROL SCHEME INCOMER-A TO MCC CONTROLLED FROM DDCCMS ONLY						
DRG. NO. EP-4-CS-048-037	NO. OF SHEETS: 10	SHEET NO.: 08	REV. NO.: 00				

R81, NUMERICAL RELAY



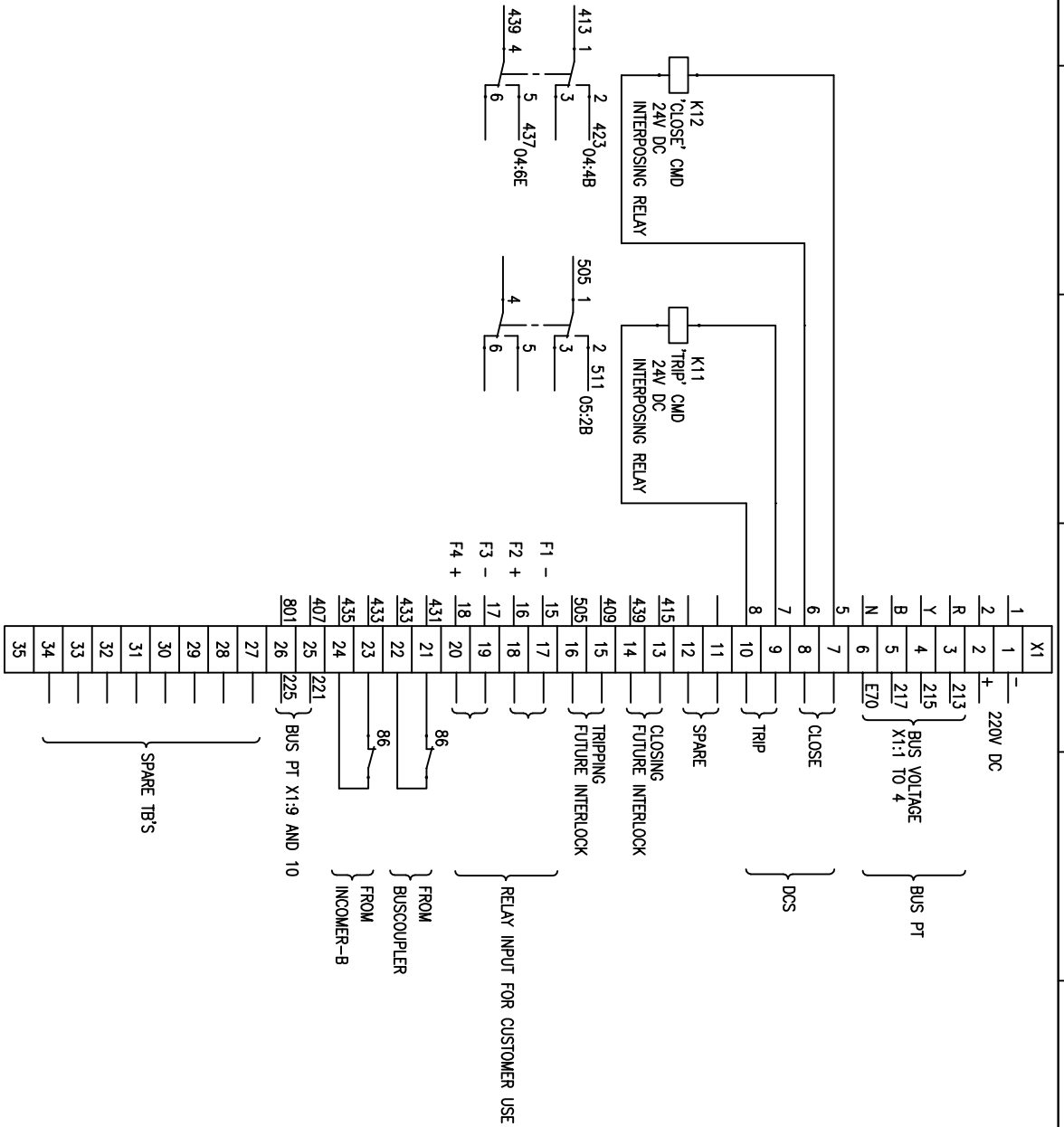
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

TWO REAR COMMUNICATION PORTS



DRG. NO. EP-4-CS-048-037



1 2 3 4 5 6 7 8

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	NO. OF SHEETS	REV.
1					CHECKED	JAGADISH		11.07.16	NA	CP-14-048	EP-4-CS-048-037	10	10	00
2					DRAWN	JAGADISH		11.07.16						
3					DESIGNED	JAGADISH		11.07.16						
4														



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWER DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
INCOMER-A TO MCC CONTROLLED FROM DDCMIS ONLY



NO. OF SHEETS: 10  
SHEET NO.: 10

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DRG. NO. EP-4-CS-048-038

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



CUSTOMER:

TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:  
1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA

Sl No	SWITCHBOARD DESCRIPTION	DESIGN	RATING
1	415V UNIT BOILER ACDB	1HB	630A
2	415V UNIT SERVICE ACDB	10A	630A
3	415V AIR CONDITIONING MCC	07A	1000A
4	415V COMPRESSOR MCC	05H	1000A
5	415V MISC SERVICES MCC	00A	630A
6	415V VENTILATION MCC	17A	1000A
7	415V RAW WATER INTAKE PH PMCC	001	630A
8	415V SERVICE BUILDING MCC	05G	1000A
9	415V DM PLANT MCC	05A	630A
10	415V CPU MCC	05B	630A
11	415V FUEL OIL SERVICE PH PMCC	00G	1600A

CUSTOMER CONSULTANT:  
 DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-038	NO. OF SHEETS	NO. OF SHEETS	REV.
4													10	01	00
3						DESIGNED	JAGADISH		11.07.16						
2						DRAWN									
1						CHECKED	JAGADISH		11.07.16						



BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
INCOMER-B TO MCC CONTROLLED FROM DDGMS ONLY



NO. OF SHEETS

NO. OF SHEETS

NO. OF SHEETS

NO. OF SHEETS

DRG. NO. EP-4-CS-048-038

\*\* - AS PER RATING  
OF THE SWITCHBOARD

CT21-23  
RATIO : \*\*/1A  
BURDEN:1:5VA  
CLASS:0.5

03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

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03:1A

03:1A

03:1A

03:1A

03:1A

03:1A

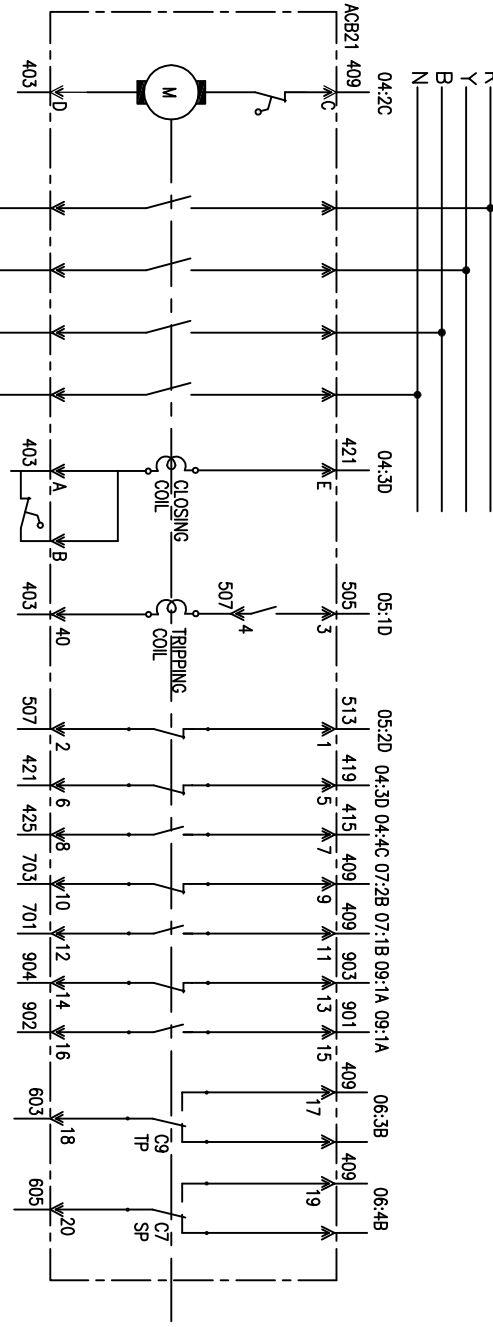
03:1A

03:1A

03:1A

03:1A

415V, 3PH, 4W, BUS, 50HZ, SOKA FOR 1SEC.



4-20mA	4-20mA
0/P-1	0/P-2
X2:21 22	33 34
CTD	5 6 7 8
M L	12 13 15 16

03:5E	925 X2:25	4-20mA
926 X2:26	0/P-1	
937 X2:37	4-20mA	
938 X2:38	0/P-2	

MFM21	1L	1S	1T	1U	1V	1W	1X	1Y	1Z
RS485	1L	1S	1T	1U	1V	1W	1X	1Y	1Z
+	1L	1S	1T	1U	1V	1W	1X	1Y	1Z
-	1L	1S	1T	1U	1V	1W	1X	1Y	1Z

INVENTORY NO.	REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE
1	1						JAGADISH		11.07.16
2	2						JAGADISH		11.07.16
3	3						JAGADISH		11.07.16
4	4						JAGADISH		11.07.16

BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROPOWERELAINS DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
INCOMER-B TO MCC CONTROLLED FROM DDCMIS ONLY

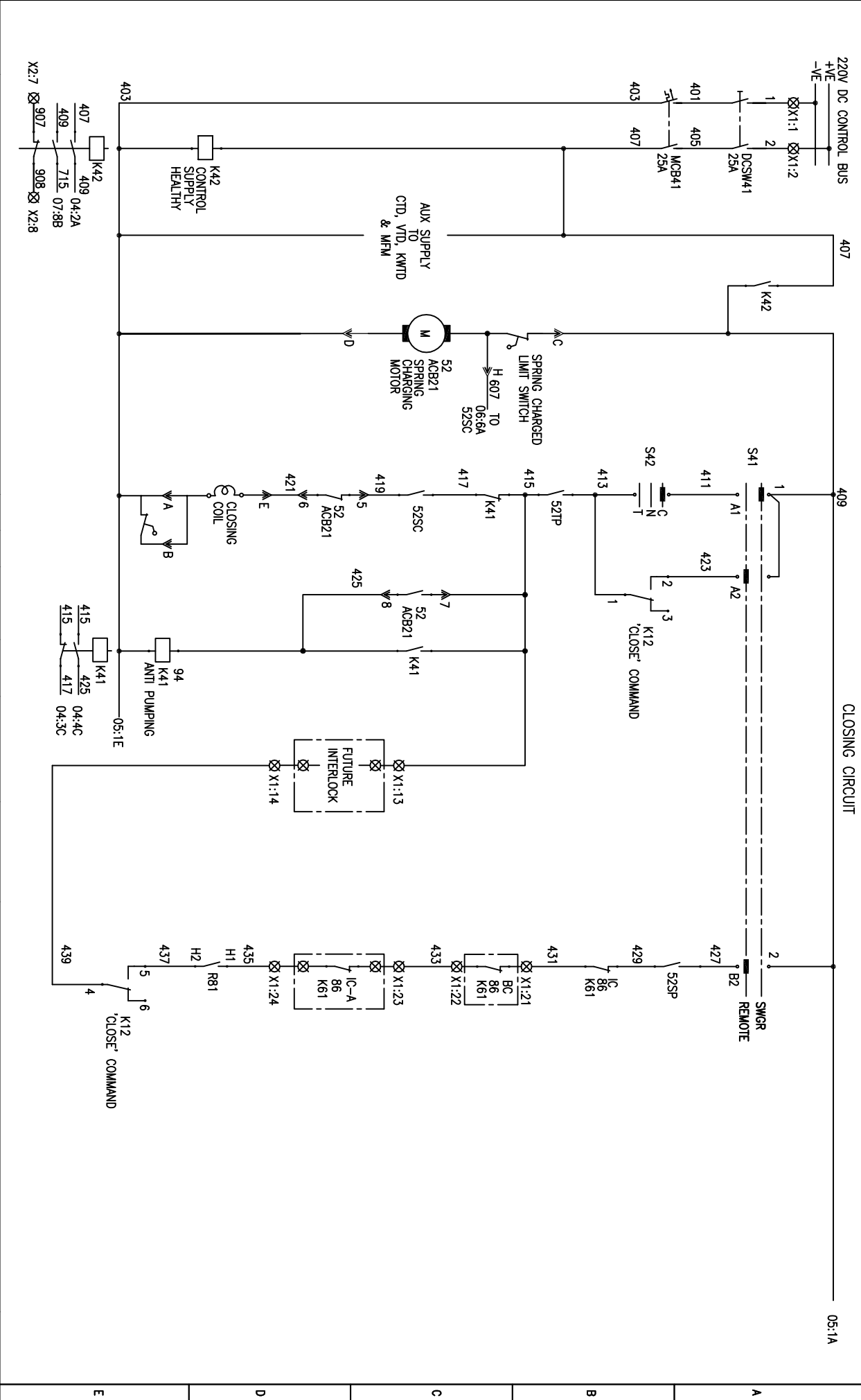
JOB NO. CP-14-048  
DRG. NO. EP-4-CS-048-038

NO. OF SHEETS: 10  
SHEET NO.: 02

REV. NO.: 00



DRG. NO. EP-4-CS-048-038



FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM  
05:1A

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH		11.07.16	MA	CP-14-048	EP-4-CS-048-038	10	04	00
2					DRAWN	JAGADISH		11.07.16						
3					DESIGNED	JAGADISH		11.07.16						
4														

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWER DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
INCOMER-B TO MCC CONTROLLED FROM DDCMIS ONLY



NO. OF SHEETS: 10  
SHEET NO.: 04



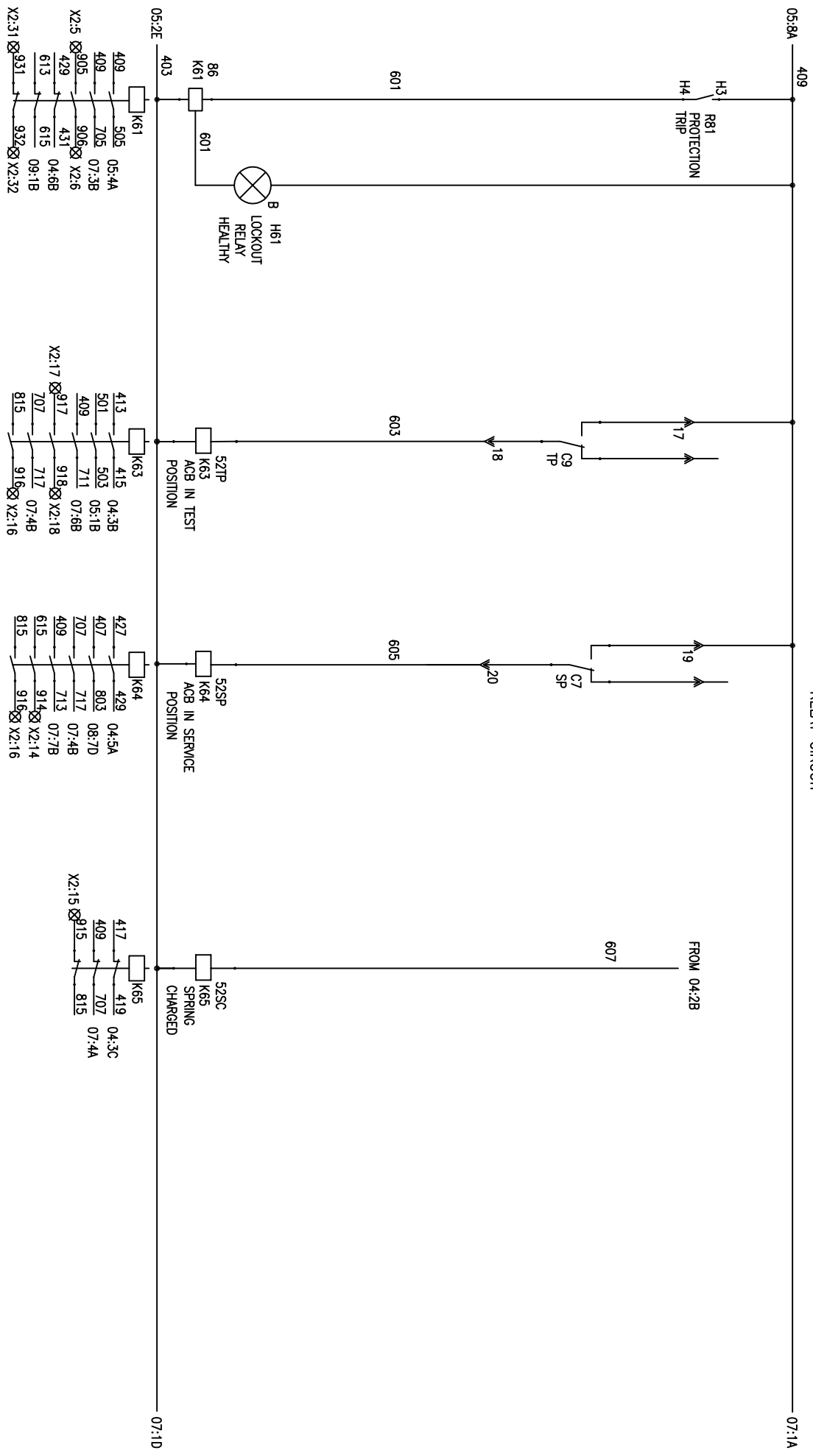
DRG. NO. EP-4-CS-048-038

FORM 66-271 A3

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

RELAY CIRCUIT



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-038	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH	11.07.16			10	06	00
2					DRAWN							
3					DESIGNED	JAGADISH	11.07.16					
4												

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE



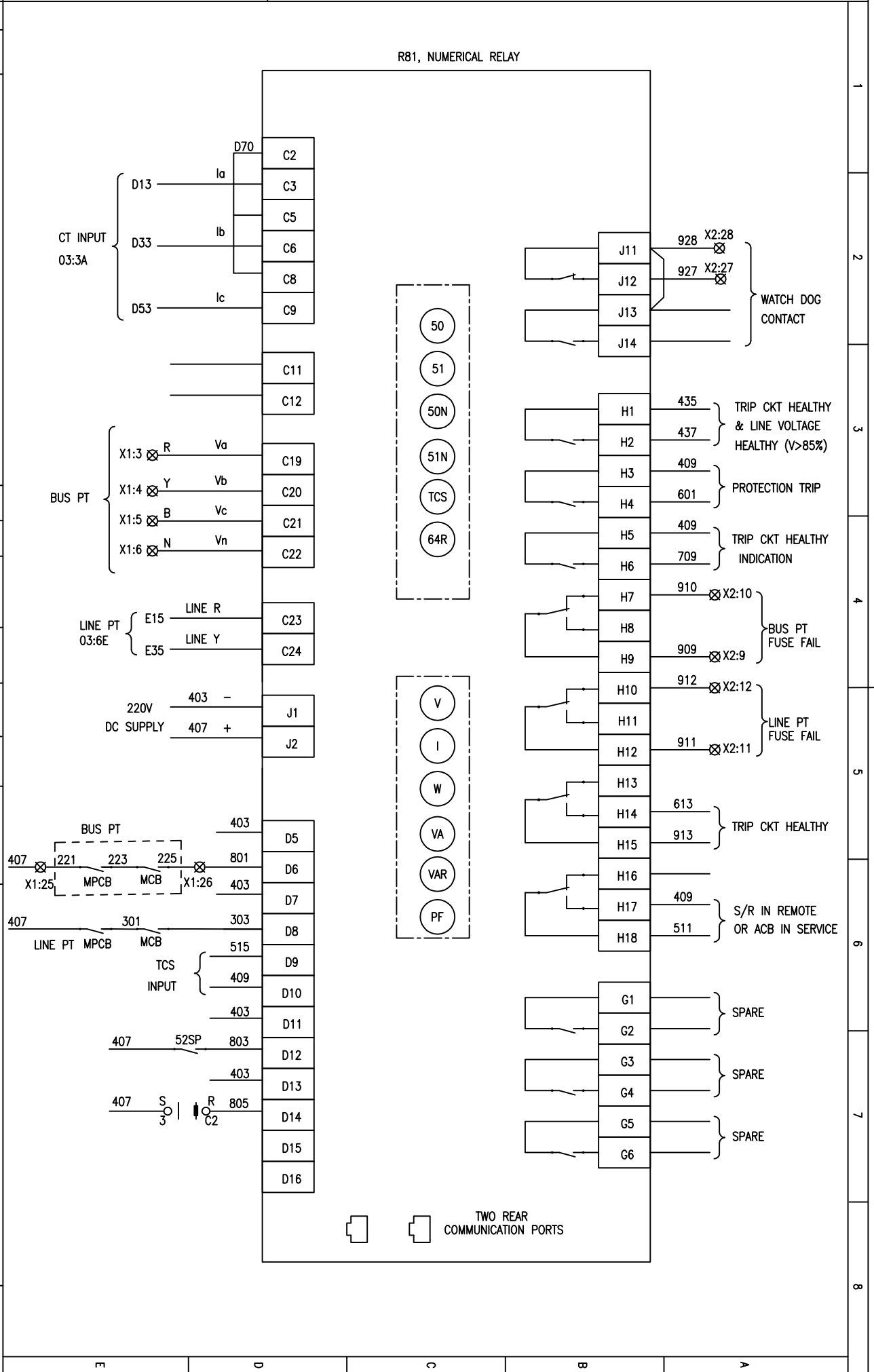
TITLE :  
POWER & CONTROL SCHEME  
INCOMER-B TO MCC CONTROLLED FROM DDCMIS ONLY





INVENTORY NO. DRG. NO. EP-4-CS-048-038

REV. NO.	1	2	3	4
DATE				
DESCRIPTION				
BY				
APPD.				
APPROVED	CHECKED	DRAWN	DESIGNED	
KSB	JAGADISH		JAGADISH	
DATE	11.07.16	11.07.16	11.07.16	
SCALE	NA			
JOB NO.	CP-14-048			
DRG. NO.	EP-4-CS-048-038			
NO. OF SHEETS	10			
SHEET NO.	08			
REV.	00			



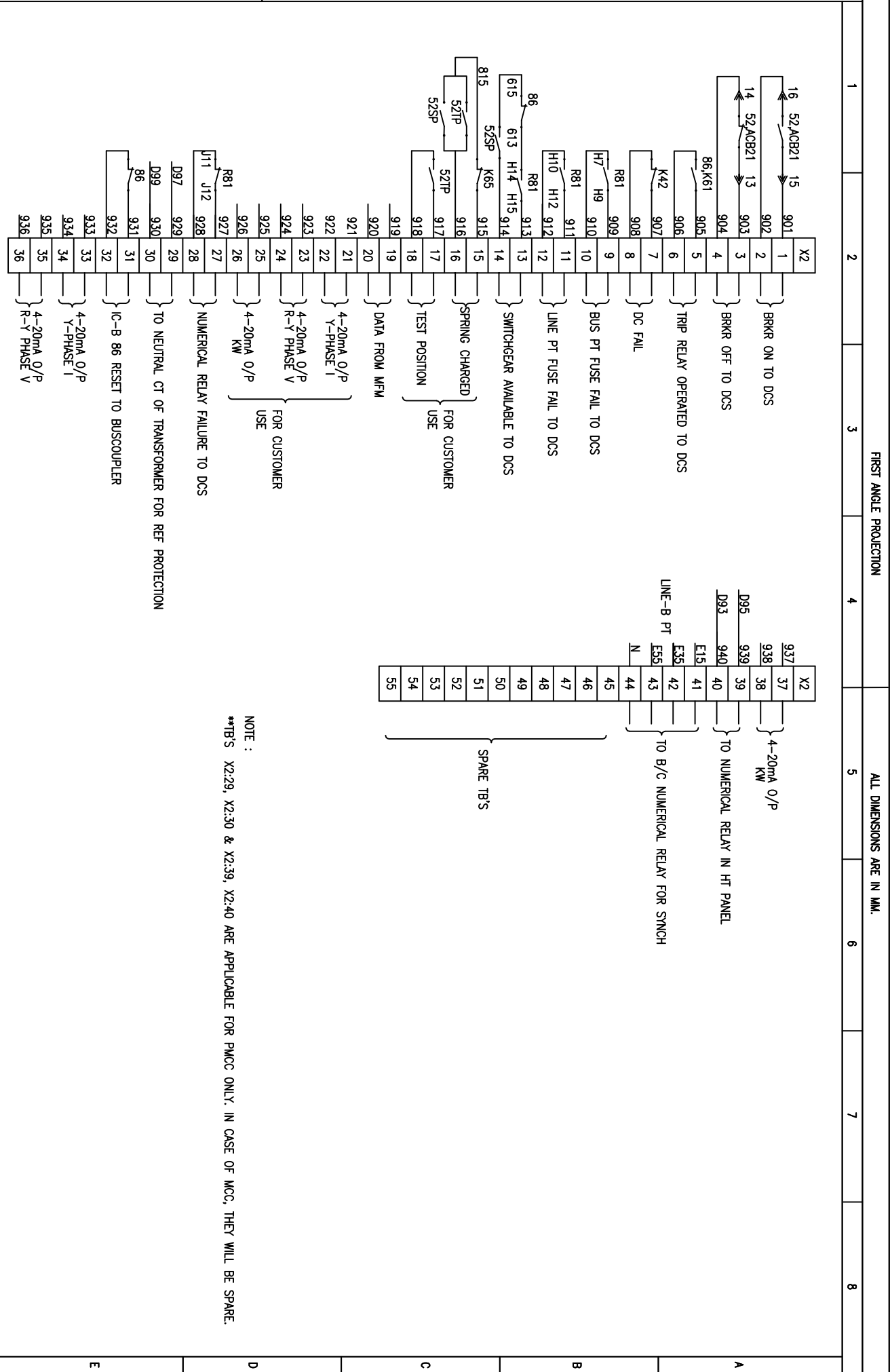
FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1  
2  
3  
4  
5  
6  
7  
8

E D C B A

DRG. NO. EP-4-CS-048-038



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

NOTE :  
\*\*TB'S X2:29, X2:30 & X2:39, X2:40 ARE APPLICABLE FOR PMCC ONLY. IN CASE OF MCC, THEY WILL BE SPARE.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH		11.07.16	NA	CP-14-048	EP-4-CS-048-038	10	09	00
2					DRAWN	JAGADISH		11.07.16						
3					DESIGNED	JAGADISH		11.07.16						
4														

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTION DIVISION BANGALORE



TITLE :  
POWER & CONTROL SCHEME  
INCOMER-B TO MCC CONTROLLED FROM DDCCMS ONLY





FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

1

2

3

4

5

6

7

8

CUSTOMER:



TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA STATE  
INDIA

PROJECT:

1x800 MW KOTHAGUDAM THERMAL POWER STATION  
STAGE-VII, UNIT#12  
PALONCHA



CUSTOMER CONSULTANT:  
  
DEVELOPMENT CONSULTANTS PVT LTD  
KOLKATA

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DRG. NO. EP-4-CS-048-039

INVENTORY NO.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-039	NO. OF SHEETS	SHEET NO.	REV.
4												11	01	00
3					DESIGNED	JAGADISH		11.07.16				11	01	
2					DRAWN									
1					CHECKED	JAGADISH		11.07.16						



BHARAT HEAVY ELECTRICALS LIMITED  
ELECTROFORCELANS DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY



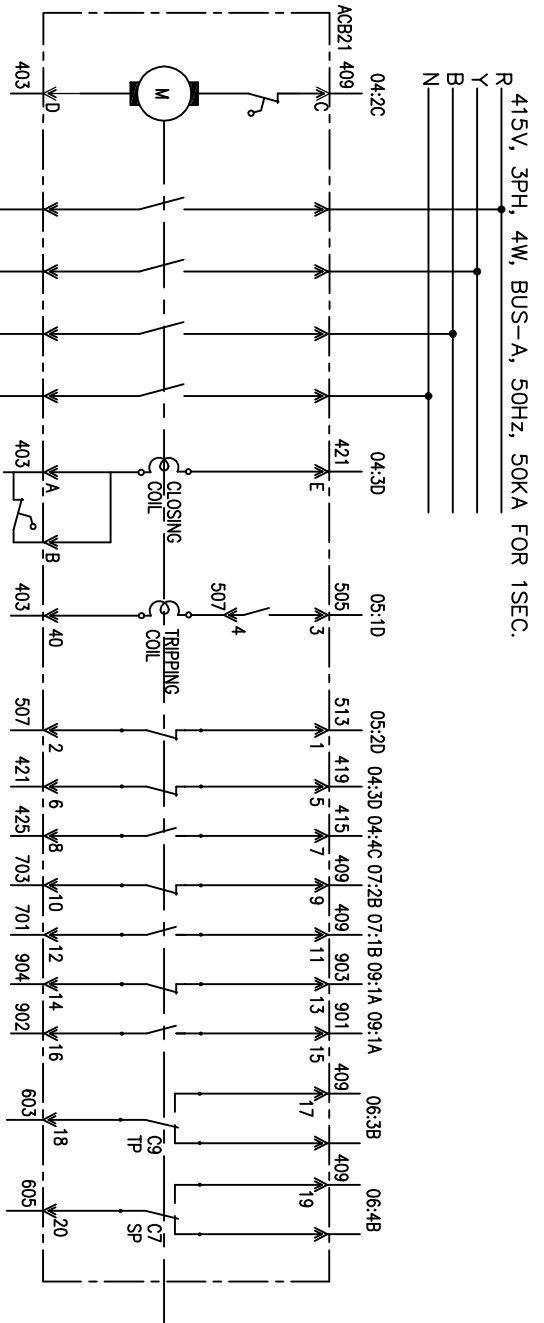
NO. OF SHEETS

SHEET NO.

DRG. NO. EP-4-CS-048-039

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-039	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH		11.07.16				11	02	00
2					DRAWN	JAGADISH		11.07.16						
3					DESIGNED	JAGADISH		11.07.16						
4														

FORM 66-271 A3

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTANS DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY



03:1E

E

D

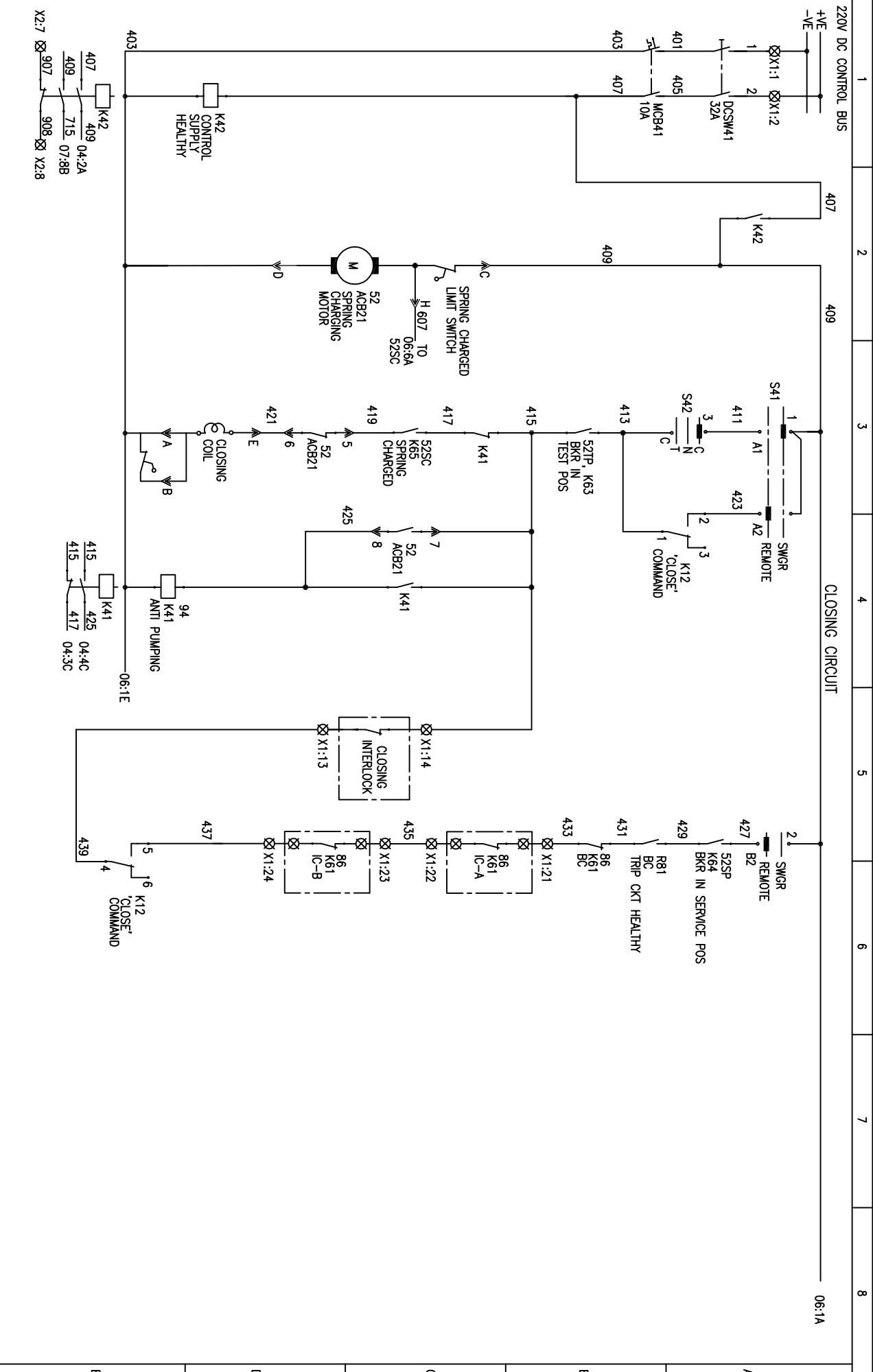
C

B

A



DRG. NO. EP-4-CS-048-039



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-039	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH	11.07.16			11	04	00
2					DRAWN							
3					DESIGNED	JAGADISH	11.07.16					
4												

FORM 66-271 A3

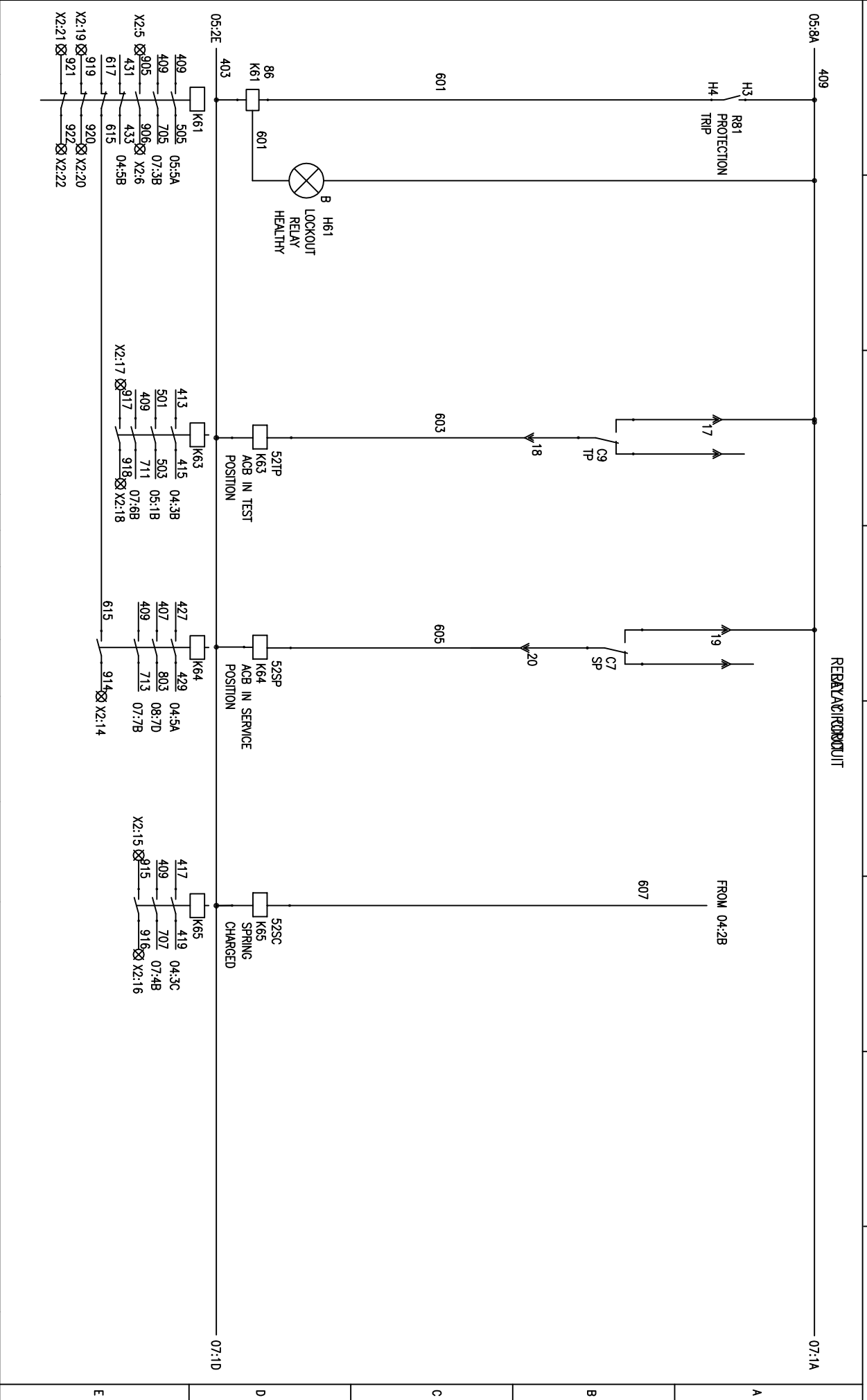
**BHARAT HEAVY ELECTRICALS LIMITED**  
 ELECTROPROTECTANS DIVISION BANGALORE

TITLE :  
 POWER & CONTROL SCHEME  
 BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY





DRG. NO. EP-4-CS-048-039



FIRST ANGLE PROJECTION  
ALL DIMENSIONS ARE IN MM  
1 2 3 4 5 6 7 8

INVENTORY NO.	REV.	DATE	DESCRIPTION	BY	APPD.	APPROVED	KSB	SCALE: NA	JOB NO. CP-14-048	DRG. NO. EP-4-CS-048-039	NO. OF SHEETS	SHEET NO.	REV.
4											11	06	00
3											11	06	
2											11	06	
1											11	06	

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERELANS DIVISION BANGALORE

TITLE :  
POWER & CONTROL SCHEME  
BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY

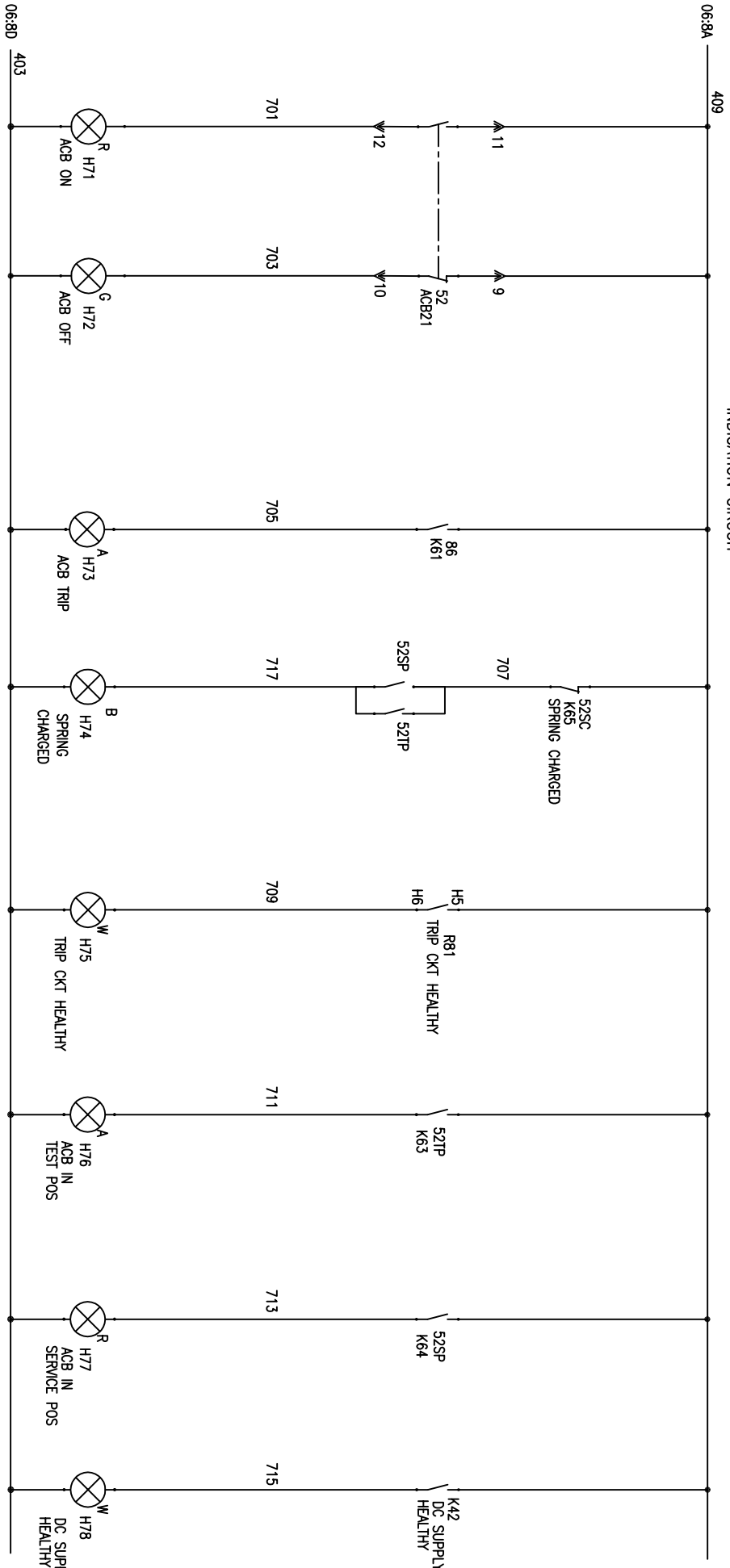


DRG. NO. EP-4-CS-048-039

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

INDICATION CIRCUIT




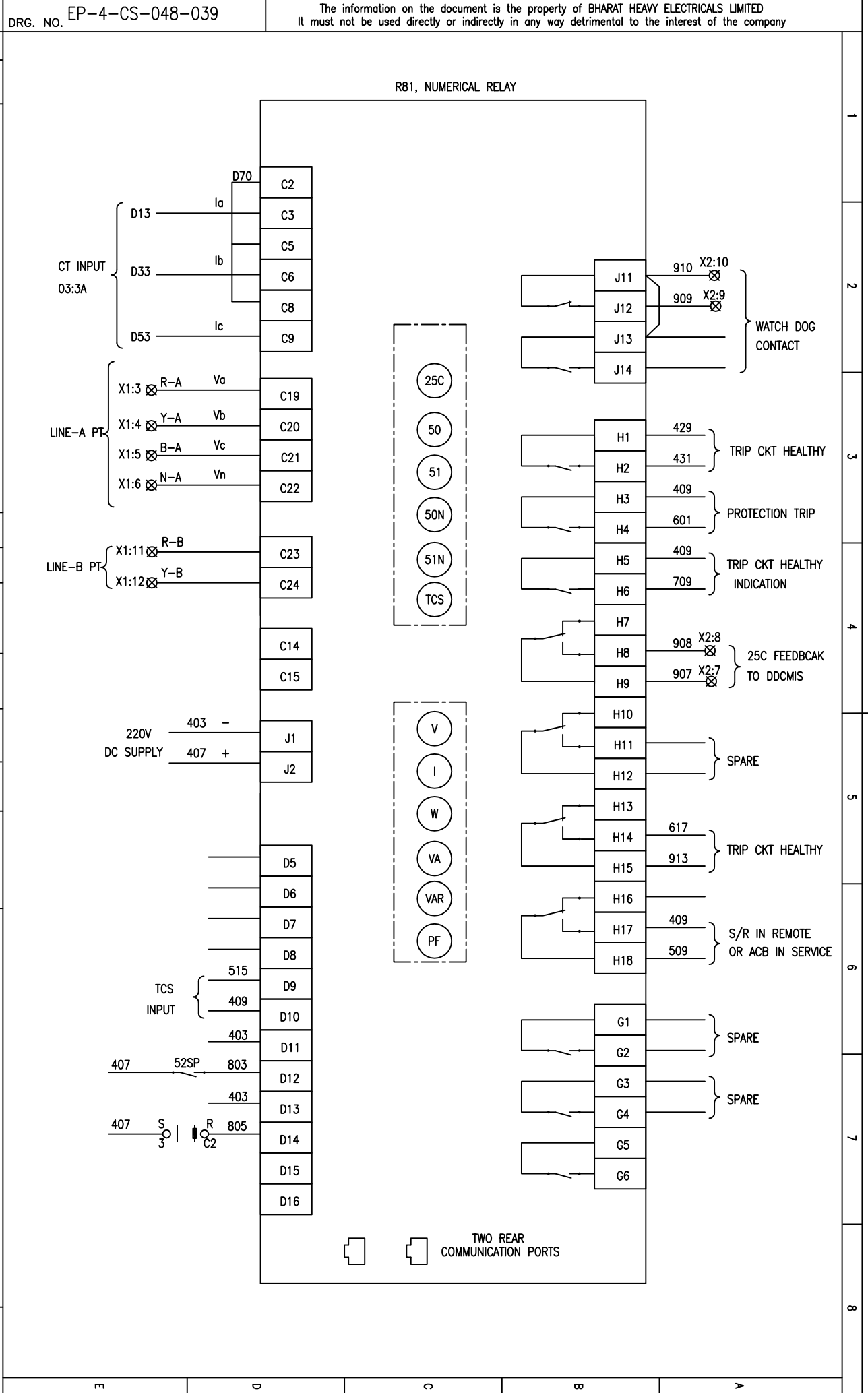
REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	SHEET NO.	REV.
1					CHECKED	JAGADISH	<i>[Signature]</i>	11.07.16	MA	CP-14-048	EP-4-CS-048-039	11	07	00
2					DRAWN	JAGADISH	<i>[Signature]</i>	11.07.16						
3					DESIGNED	JAGADISH	<i>[Signature]</i>	11.07.16						
4														

**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPROTECTIVES DIVISION BANGALORE

TITLE :  
**POWER & CONTROL SCHEME**  
BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY



INVENTORY NO.		DRG. NO. EP-4-CS-048-039	
REV. NO.	DATE	DESCRIPTION	BY
1			
2			
3			
4			
APPD.	APPROVED	CHECKED	KSB
		JAGADISH	
		11.07.16	
		11.07.16	
SCALE: NA			
JOB NO. CP-14-048	TITLE: <b>POWER &amp; CONTROL SCHEME</b> BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY		
DRG. NO. EP-4-CS-048-039	NO. OF SHEETS: 11 SHEET NO.: 08 REV. NO.: 00		



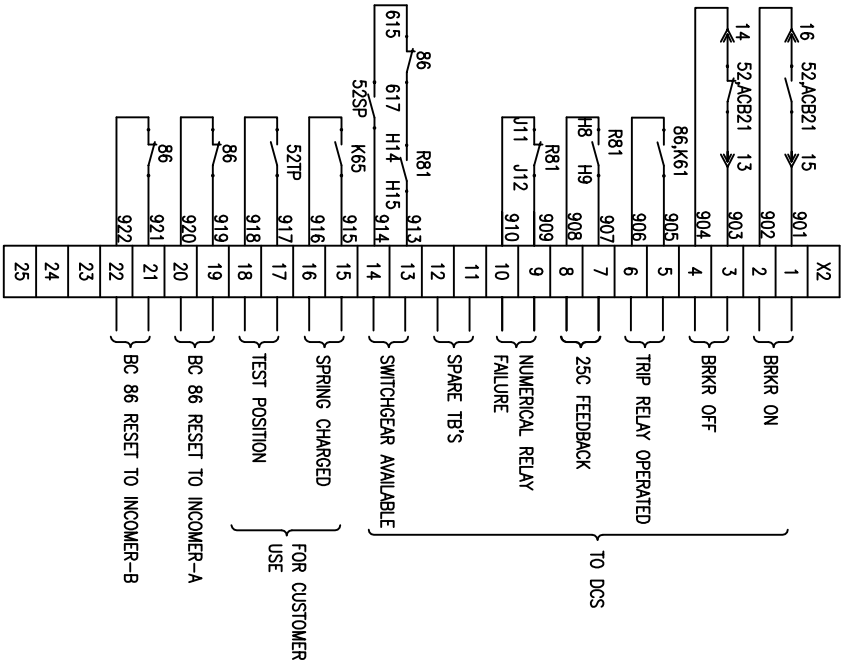
1  
2  
3  
4  
5  
6  
7  
8

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.

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DRG. NO. EP-4-CS-048-039



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-14-048	DRG. NO. EP-4-CS-048-039	NO. OF SHEETS	SHEET NO.	REV. NO.
4													11	09	00
3							JAGADISH		11.07.16				11	09	00
2							JAGADISH		11.07.16				11	09	00
1							JAGADISH		11.07.16				11	09	00



**BHARAT HEAVY ELECTRICALS LIMITED**  
ELECTROPOWERCELLS DIVISION BANGALORE

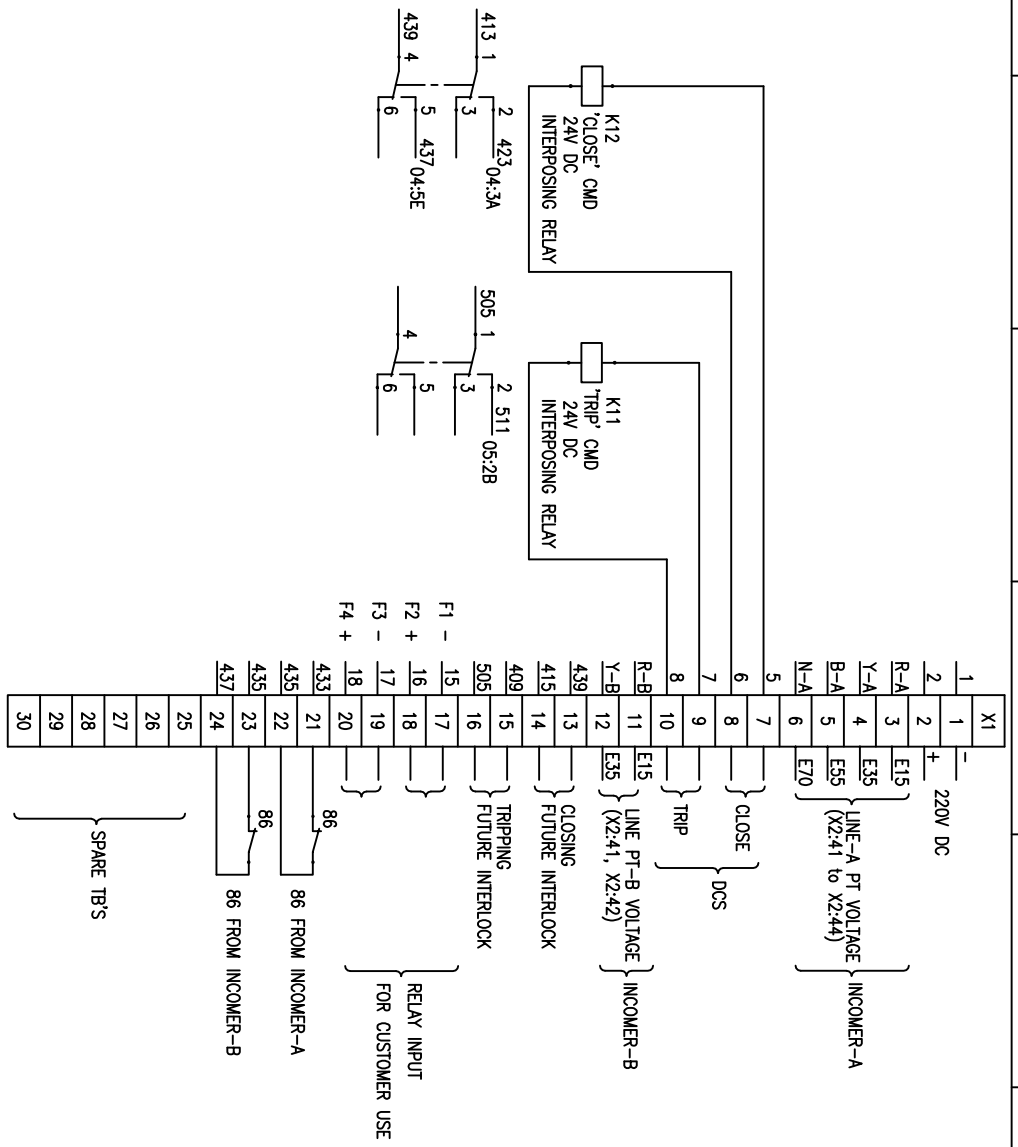
TITLE :  
POWER & CONTROL SCHEME  
BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY

DRG. NO. EP-4-CS-048-039

1 2 3 4 5 6 7 8

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM.



REV. NO.	DATE	DESCRIPTION	BY	APPD.	APPROVED	NAME	SIGN.	DATE	SCALE	JOB NO.	DRG. NO.	NO. OF SHEETS	NO. OF SHEETS	REV.
1					CHECKED	JAGADISH		11.07.16	MA	CP-14-048	EP-4-CS-048-039	11	10	00
2					DRAWN	JAGADISH		11.07.16						
3					DESIGNED	JAGADISH		11.07.16						
4														



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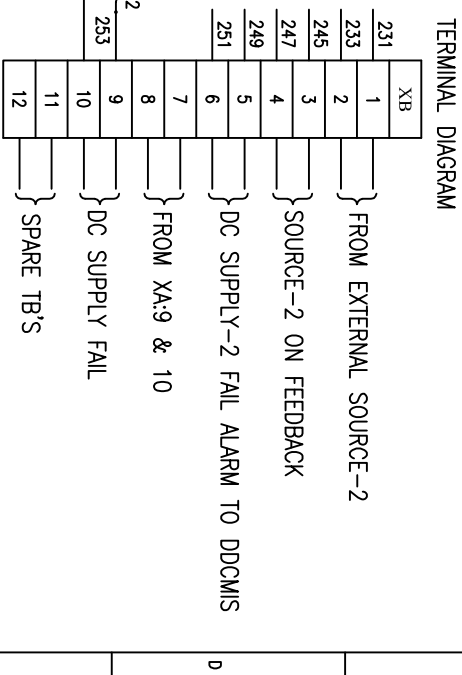
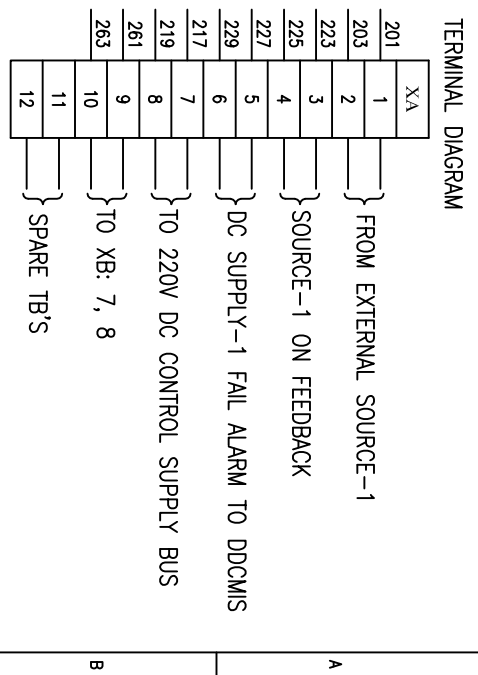
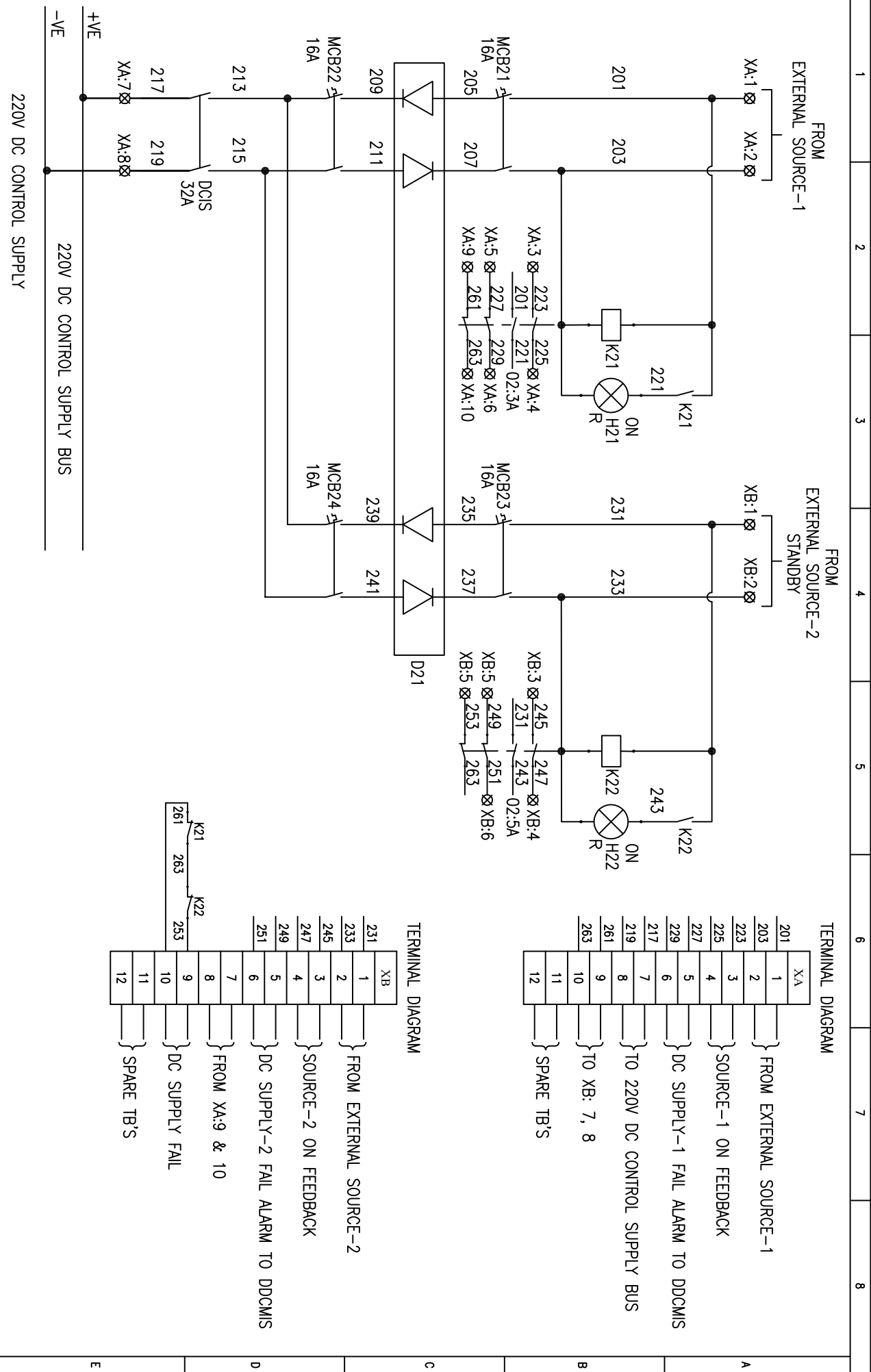


NO. OF SHEETS: 11  
SHEET NO.: 10

REV. 00

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DRG. NO. EP-4-CS-048-039



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1						JAGADISH		11.07.16	NA	CP-14-048	EP-4-CS-048-039	11	11	00
2						JAGADISH		11.07.16						
3						JAGADISH		11.07.16						
4						JAGADISH		11.07.16						



**BHARAT HEAVY ELECTRICALS LIMITED**  
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BUSCOUPLER TO MCC CONTROLLED FROM DDCMIS ONLY



NO. OF SHEETS: 11  
SHEET: 11



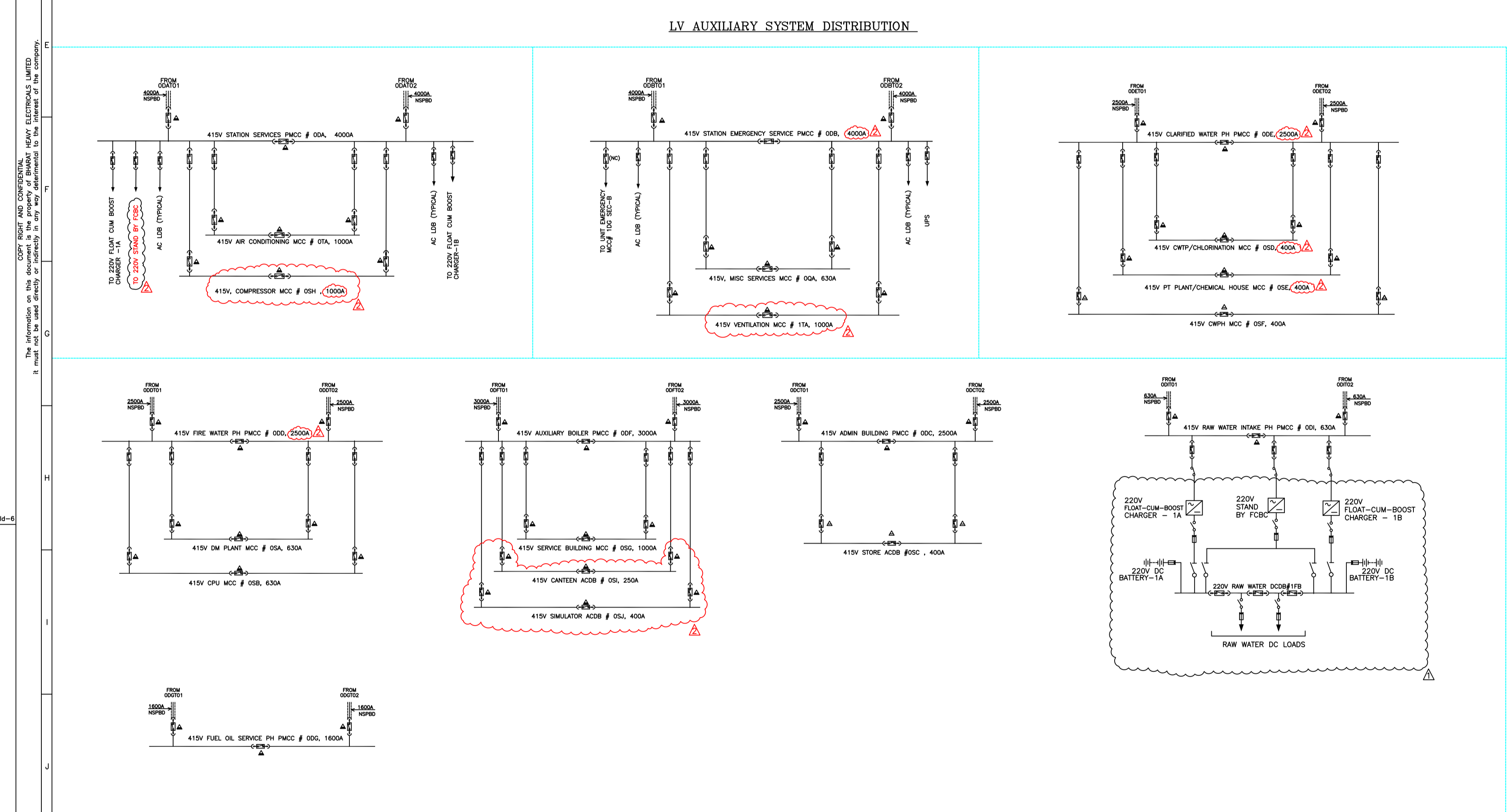
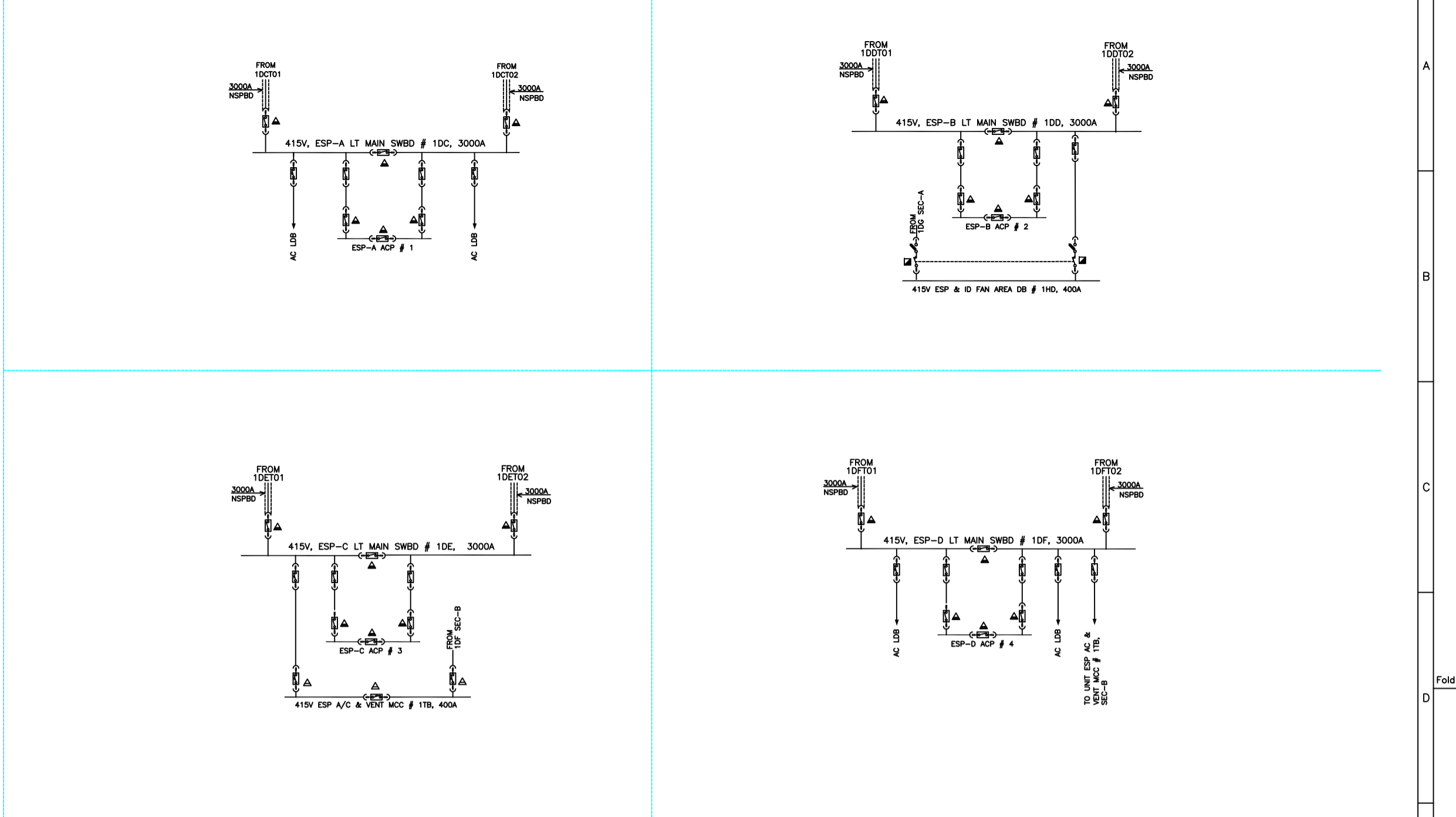
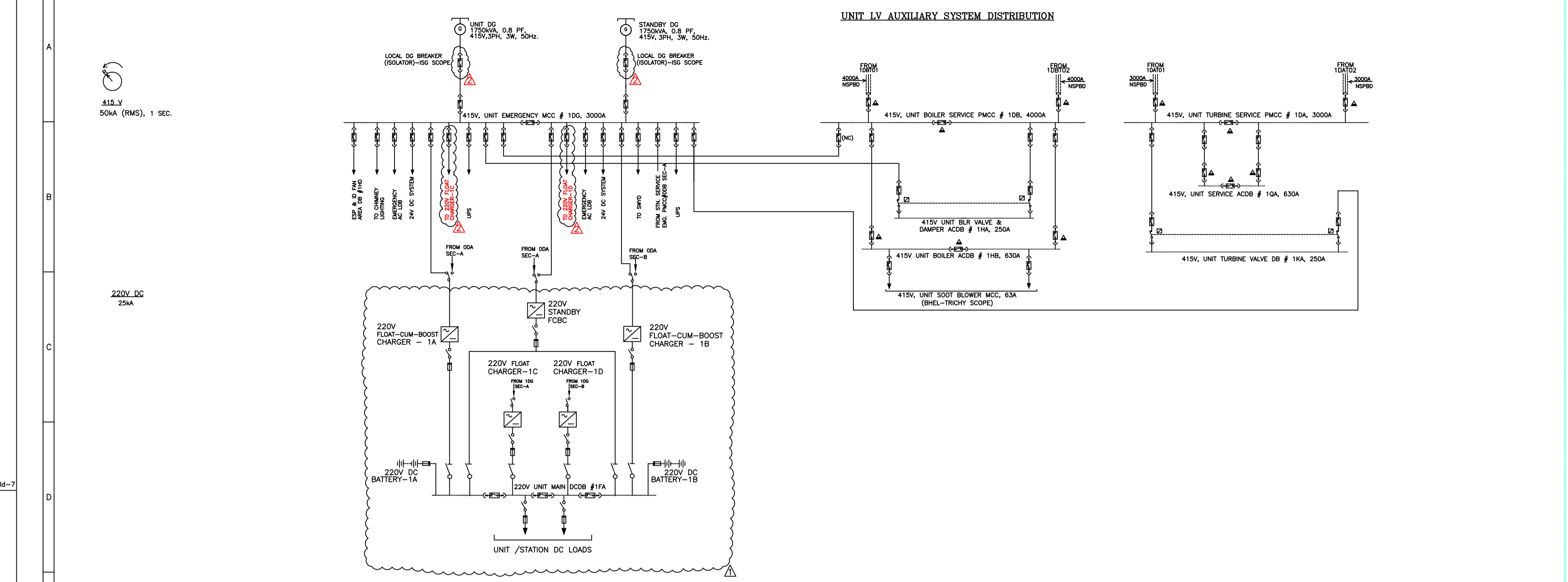
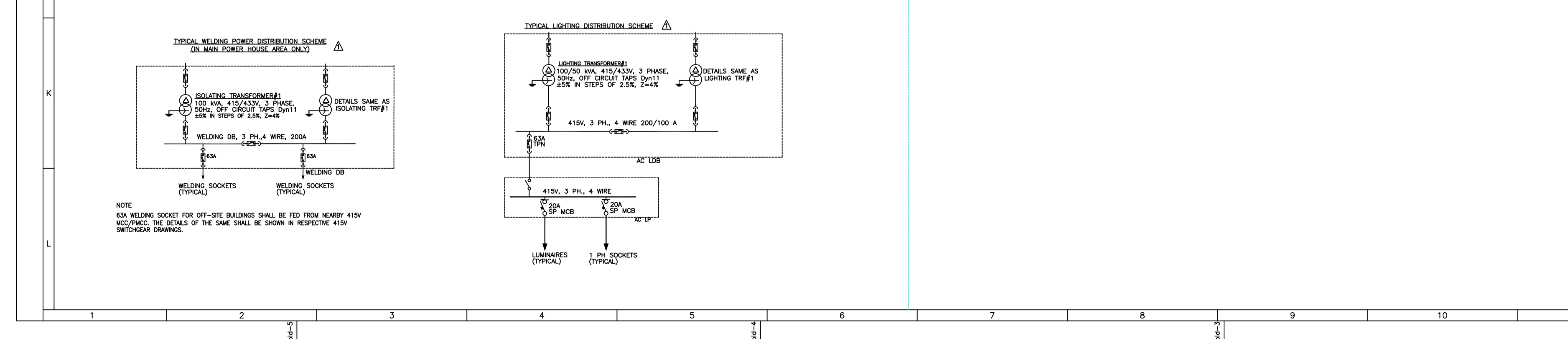


TABLE -5: SWITCHGEAR LOCATION

SL. No.	LOCATION	NAME	DESIGNATION
1	MV SWITCHGEAR ROOM MAIN POWER HOUSE BUILDING 3.5M A-C BAY	11 KV UNIT SWITCHBOARD	#18A
		11 KV UNIT SWITCHBOARD	#18B
		11 KV STATION SWITCHBOARD	#08A
		11 KV STATION SWITCHBOARD	#08B
		3.3 KV UNIT AUX. SWITCHBOARD	#10A
		3.3 KV STATION AUX. SWITCHBOARD	#0CA
2	LV SWITCHGEAR ROOM MAIN POWER HOUSE BUILDING 12M A-B BAY	220 V MAIN DCDB	#1FA
		415 V UNIT TURBINE SERVICE PMCC	#10A
		415 V STATION SERVICE PMCC	#00A
		415 V UNIT EMERGENCY MCC	#10G
		415 V UNIT TURBINE VALVE ACDB	#10A
		415 V UNIT SERVICE ACDB	#10A
		415 V UNIT BOILER SERVICE PMCC	#10B
		415 V STATION ENG. SERVICE PMCC	#00B
		415 V UNIT BOILER VALVE & DAMPER	#11A
		415 V UNIT BOILER ACDB	#11B
3	BOILER SWITCHGEAR ROOM MAIN POWER HOUSE BUILDING 27.5M C-F BAY	415 V MISCELLANEOUS SERVICE MCC	#00A
		415 V VENTILATION MCC	#1TA
		415 V SOOT BLOWER MCC	---
		415 V ESP-A LT MAIN SWITCHBOARD & CONNECTED ACP	#10C & ACP-1
4	ESP CONTROL ROOM	415 V ESP-B LT MAIN SWITCHBOARD & CONNECTED ACP	#10D & ACP-2
		415 V ESP-C LT MAIN SWITCHBOARD & CONNECTED ACP	#10E & ACP-3
		415 V ESP-D LT MAIN SWITCHBOARD & CONNECTED ACP	#10F & ACP-4
		415 V ESP & ID FAN AREA DB	#11D
5	AC PLANT ROOM	415 V AIR CONDITIONING MCC	#01A
		415 V ADMIN BLDG./FIRE STATION/STORE PMCC	#00C
6	ADMIN BUILDING	415 V ADMIN BLDG./FIRE STATION/STORE PMCC	#00C
		415 V STORE ACDB	#05C
7	INDOOR STORE	415 V STORE ACDB	#05C
		415 V FIRE WATER/DM/CPU PMCC	#00D
8	FIRE WATER PUMP HOUSE	415 V FIRE WATER/DM/CPU PMCC	#00D
		415 V DM PLANT MCC	#05A
9	DM PLANT BUILDING	415 V DM PLANT MCC	#05A
		415 V CPU MCC	#05B
10	CPU BUILDING	415 V CPU MCC	#05B
		415 V CLARIFIED WATER/CWTP/CHLORINATION OR PH PMCC	#00E
11	CLARIFIED WATER PUMP HOUSE	415 V CLARIFIED WATER/CWTP/CHLORINATION OR PH PMCC	#00E
		415 V CWTP/CHLORINATION MCC	#05D
12	CHEMICAL HOUSE	415 V CWTP/CHLORINATION MCC	#05D
		415 V PT PLANT/CHEMICAL HOUSE MCC	#05E
13	CW PUMP HOUSE	415 V CWTP/CHLORINATION MCC	#05D
		415 V CWPH MCC	#05F
14	AUXILIARY BOILER	415 V CWTP/CHLORINATION MCC	#05D
		415 V AUX. BOILER/SERVICE/BOOSTER/WAKE-UP PH PMCC	#00F
15	SERVICE BUILDING	415 V CWTP/CHLORINATION MCC	#05D
		415 V SERVICE BLDG. MCC	#05G
16	SERVICE BUILDING	415 V SERVICE BLDG. MCC	#05G
		415 V RAW WATER INTAKE PMCC	#00I
17	RAW WATER INTAKE PUMP HOUSE	3.3 KV RAW WATER INTAKE SWBD	#10C
		220V RAW WATER DCDB	#11B
18	FUEL OIL UNLOADING PUMP HOUSE	415 V FUEL OIL SERVICE PH PMCC	#00D
		415 V COMPRESSOR MCC	#05H
19	COMPRESSOR HOUSE	415 V COMPRESSOR MCC	#05H
		415 V CANTEN ACDB	#05I
20	CANTEN BUILDING	415 V CANTEN ACDB	#05I
		415 V SIMULATOR ACDB	#05J
21	TRAINING & SIMULATOR ROOM	415 V SIMULATOR ACDB	#05J



FOR NOTES AND LEGEND, REFER SHEET 1.

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD  
TELANGANA, INDIA  
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.  
CONSULTING ENGINEERS  
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD  
POWER SECTOR  
PROJECT ENGINEERING MANAGEMENT  
NOIDA

JOB NO. 410  
STATUS CONTRACT  
DISTRIBUTION

REV. 02 DATE 18.02.16 ALD CE CHD ANR/SKG MS SC APPD MS SC

REV. 01 DATE 09.06.15 ALD CE CHD ANR/SKG MS SC APPD MS SC

1) DOCUMENT REVISED AS PER CUSTOMER COMMENTS RECEIVED VISE TRANSMITTL. DTD-25/06/15.

2) REVISION MARKED AS Δ

3) 2KW-50 MOTOR IS CHANGED FROM LT TO 415V PER MOM WITH CUSTOMER, DTD-25/06/15.

1) DOCUMENT REVISED AS PER CUSTOMER COMMENTS RECEIVED VISE TRANSMITTL. REF. NO-0266, DTD-25/06/15.

TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR AUXILIARY POWER DISTRIBUTION

DEPT. SCALE: SHEET 2 OF 2

DRAWING NO. PE-DG-410-565-E001

REV. 02

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