

TD-201 Rev No. 00	Form No.	 	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION, HYDERABAD	ANNEXURE-2A to PY55223
				Rev No. 00
				Page 1 of 28

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

ANNEXURE-2A TO PY55223

REFERENCE SCHEMES FOR LOW VOLTAGE SWITCHBOARDS

(These Schemes are FOR REFERENCE ONLY and may not cover all protection & operational aspects needed for safe and healthy operation of the system. These shall also be referenced for estimating DI/DOs of Numerical Relays for bid purpose and for preparing various schemes during detailed engineering.

The Final Schemes shall be designed to meet all the requirements specified in the Main Specification and its Annexures-1A, 1B, 1C, 2A, 2B, 2C, 3, 4 & 7 without any price/time impact.)

PROJECT

40MW CDQ WASTE HEAT RECOVERY
CO-GENERATION POWER PLANT

CUSTOMER

M/S TATA STEEL LIMITED,
JAMSHEDPUR

CONSULTANT

TATA CONSULTING ENGINEERS,
KOLKATA

DRG. NO. PEEC-04519

SH. 01 OF 14

LT SWITCHBOARD SCHEMES STANDARDISED LOGICS

LEGEND:

I/C – INCOMER

B/C – BUS COUPLER

O/G – OUTGOING

NR – NUMERICAL RELAY

L/R – LOCAL/REMOTE SELECTOR SWITCH

A/I/M – AUTO/INDEPENDENT/MOMENTARY

PARALLELING (MOM. PARL.) SELECTOR SWITCH

TSS – TRIP SELECTOR SWITCH

TNC – TRIP-NEUTRAL-CLOSE SWITCH

86 – MASTER TRIP RELAY (LOCKOUT RELAY)

95 – TRIP CIRCUIT SUPERVISION RELAY

TCS – TRIP CIRCUIT SUPERVISION

COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					NAME	SIGN.	DATE	NO. OF VAR.
				DRN.	SA		11.01.2014	-N.A.-
				CHD.	KRM	K. Ranganani	16.01.2014	
				APPD.	BCM		20.01.2014	
DEPT.	UNTOL. DIMS. GR. G/M/F		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG. -N.A.-		ITEM NO. -N.A.-	NO. OF ITEMS -N.A.-
CODE								
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS				CARD CODE N.A.	DRAWING NO. PEEC-04519			REV. 00
					SHT. No	01	NO. OF SHT.	14

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

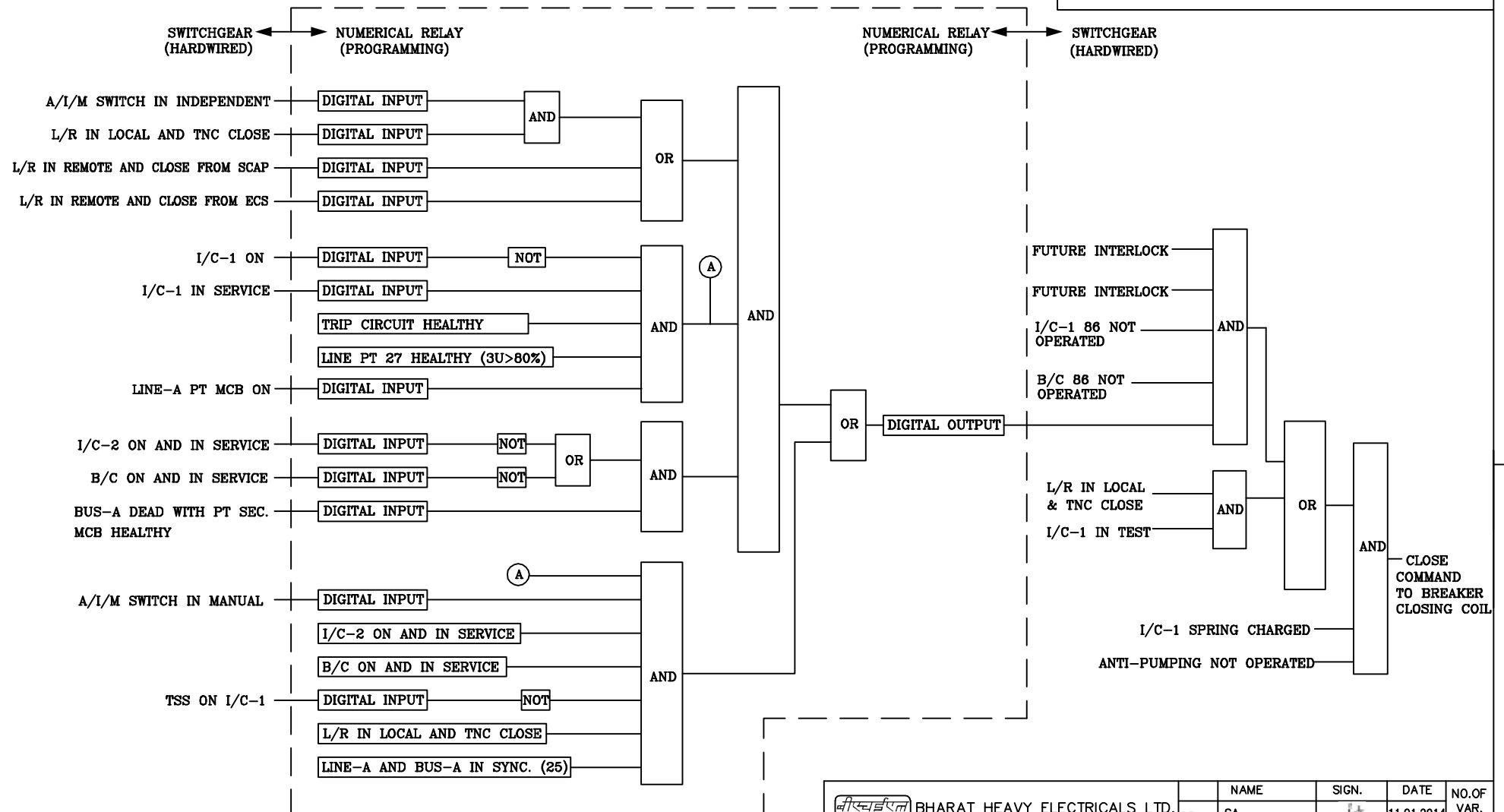
(ALL DIMENSIONS ARE IN mm)

ACB I/C-1

PEEC-04519

DRG. NO.

SH. 02 OF 14



 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD						NAME	SIGN.	DATE	NO.OF VAR.
					DRN.	SA		11.01.2014	-N.A.-
					CHD.	KRM		16.01.2014	
					APPD.	BCM		20.01.2014	
DEPT.	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG. -N.A.-		ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-	
CODE	G/M/F								
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS					CARD CODE	DRAWING NO.			REV. 00
						PEEC-04519			
					N.A.	SHT. No 02	NO. OF SHT. 14		

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

ACB I/C-1

DRG. NO. PEEC-04519

SH. 03 OF 14

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

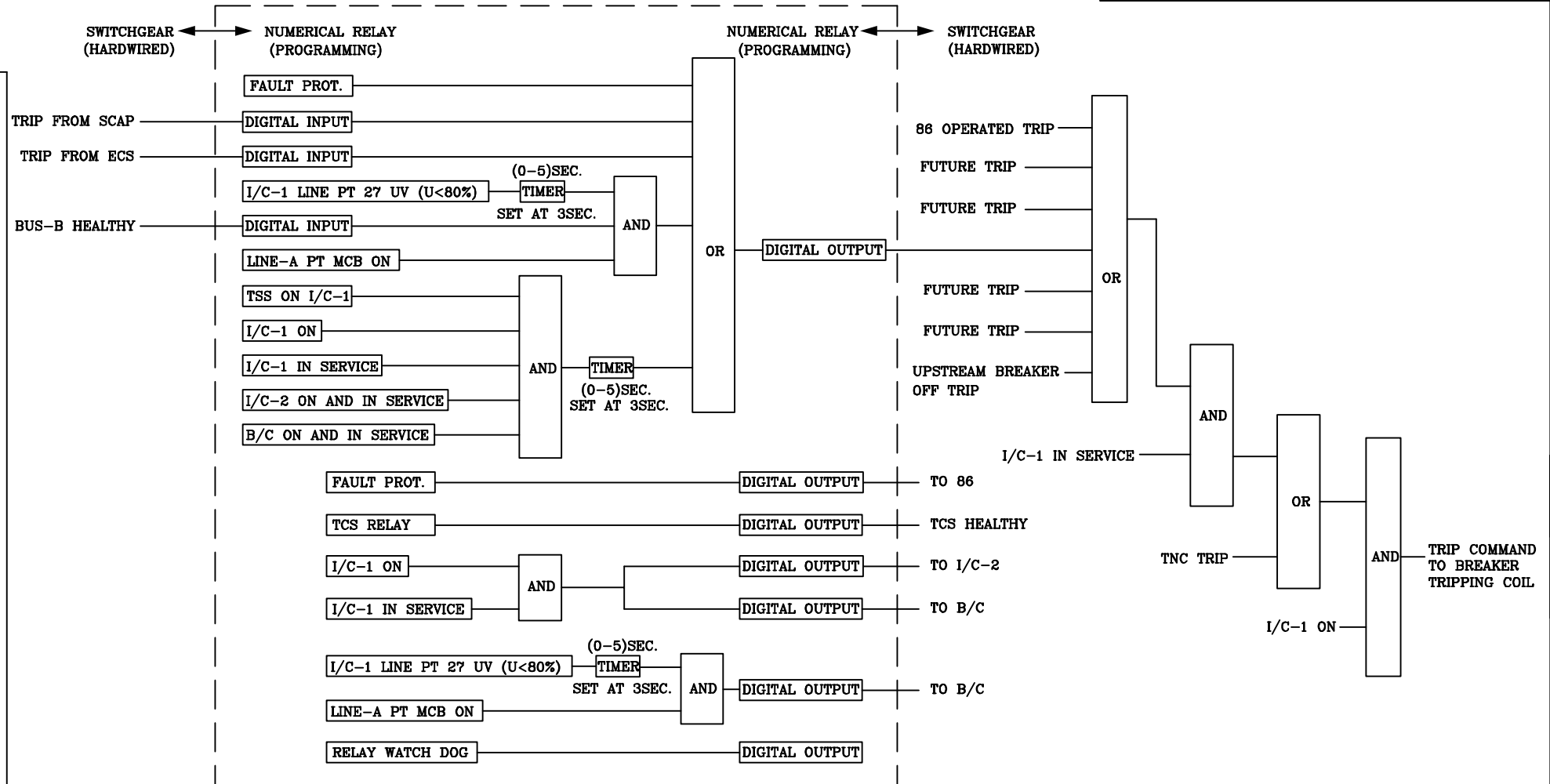
COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

NAME	SIGN.	DATE	NO. OF VAR.
DRN. SA		11.01.2014	
CHD. KRM		16.01.2014	
APPD. BCM		20.01.2014	-N.A.-
REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS	REV.
-N.A.-	-N.A.-	-N.A.-	00
SHT. No 03	No. OF SHT. 14		

DEPT. UNTO. DIMS. GR. SCALE WEIGHT (KG)

TITLE LT SWITCHBOARD SCHEMES
STANDARDISED LOGICS

CARD CODE N.A.

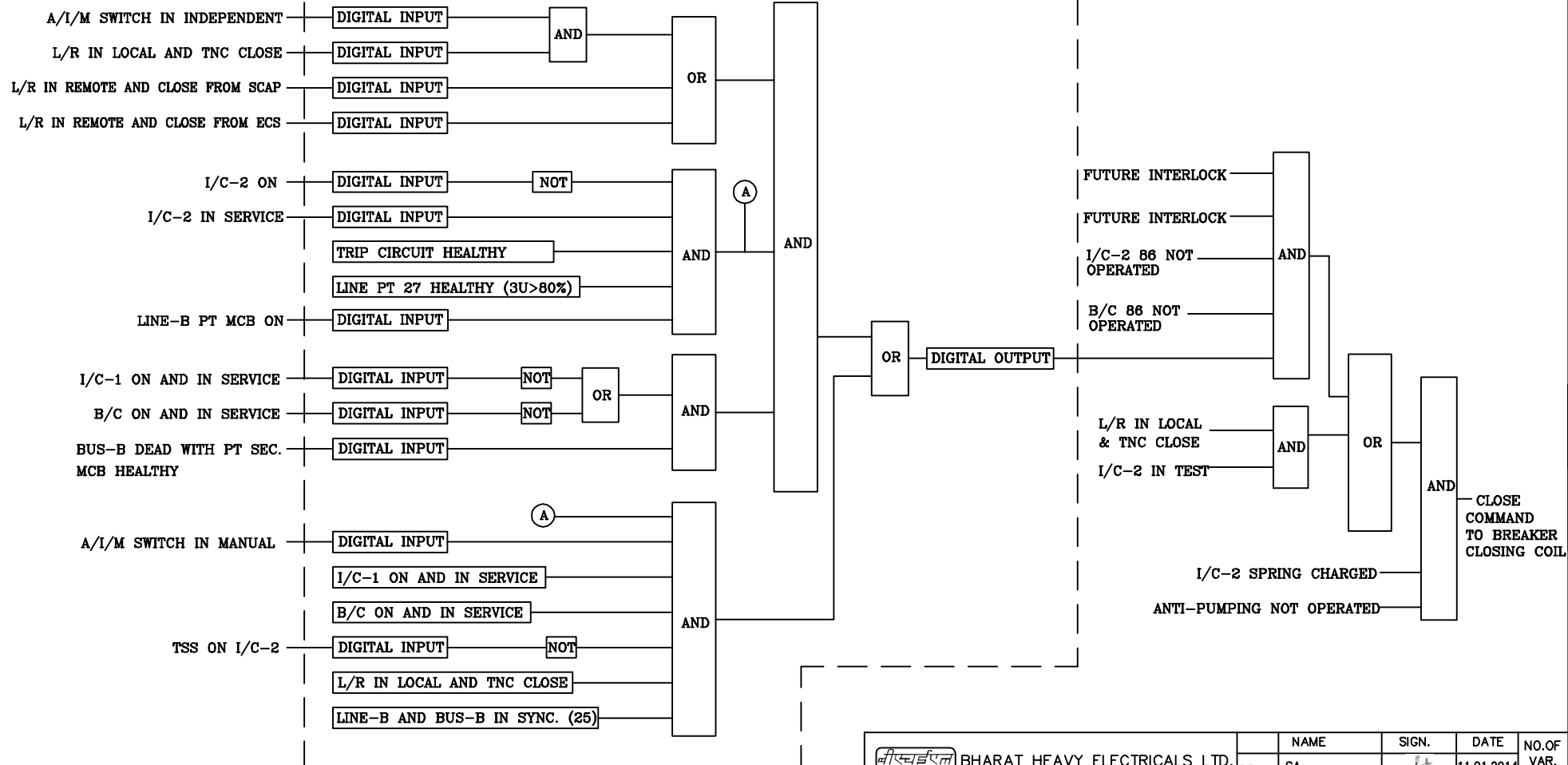
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. PEEC-04519

SH. 04 OF 14

ACB I/C-2

SWITCHGEAR
(HARDWIRED)NUMERICAL RELAY
(PROGRAMMING)NUMERICAL RELAY
(PROGRAMMING)SWITCHGEAR
(HARDWIRED)

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME	SIGN.	DATE	NO. OF VAR.
DEPT.	UNTOL. DIMS. GR.	DRN.	SA	11.01.2014	
CODE	SCALE	CHD.	KRM	16.01.2014	
	WEIGHT (KG)	APPD.	BCM	20.01.2014	
TITLE		REF. TO ASSY. DRG.		ITEM NO.	NO. OF ITEMS
LT SWITCHBOARD SCHEMES		-N.A.-		-N.A.-	-N.A.-
STANDARDISED LOGICS		DRAWING NO.			REV.
		PEEC-04519			00
		SHT. No 04		No. OF SHT. 14	

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

ACB I/C-2

DRG. NO. PEEC-04519

SH. 06 OF 14

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

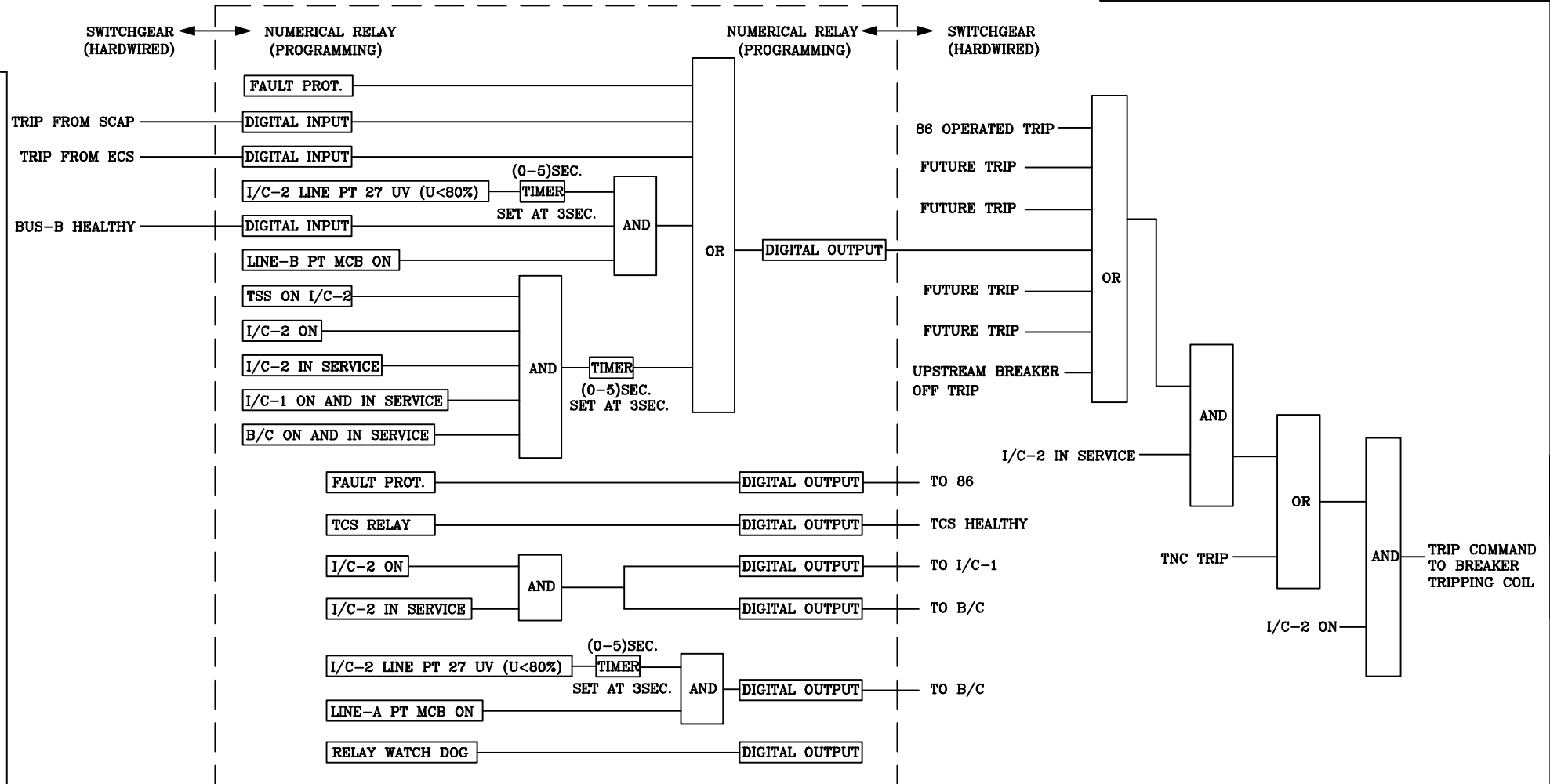
COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

NAME	SIGN.	DATE	NO. OF VAR.
DRN. SA		11.01.2014	
CHD. KRM		16.01.2014	
APPD. BCM		20.01.2014	-N.A.-
REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS	REV.
-N.A.-	-N.A.-	-N.A.-	00
SHT. No 05	No. OF SHT. 14		

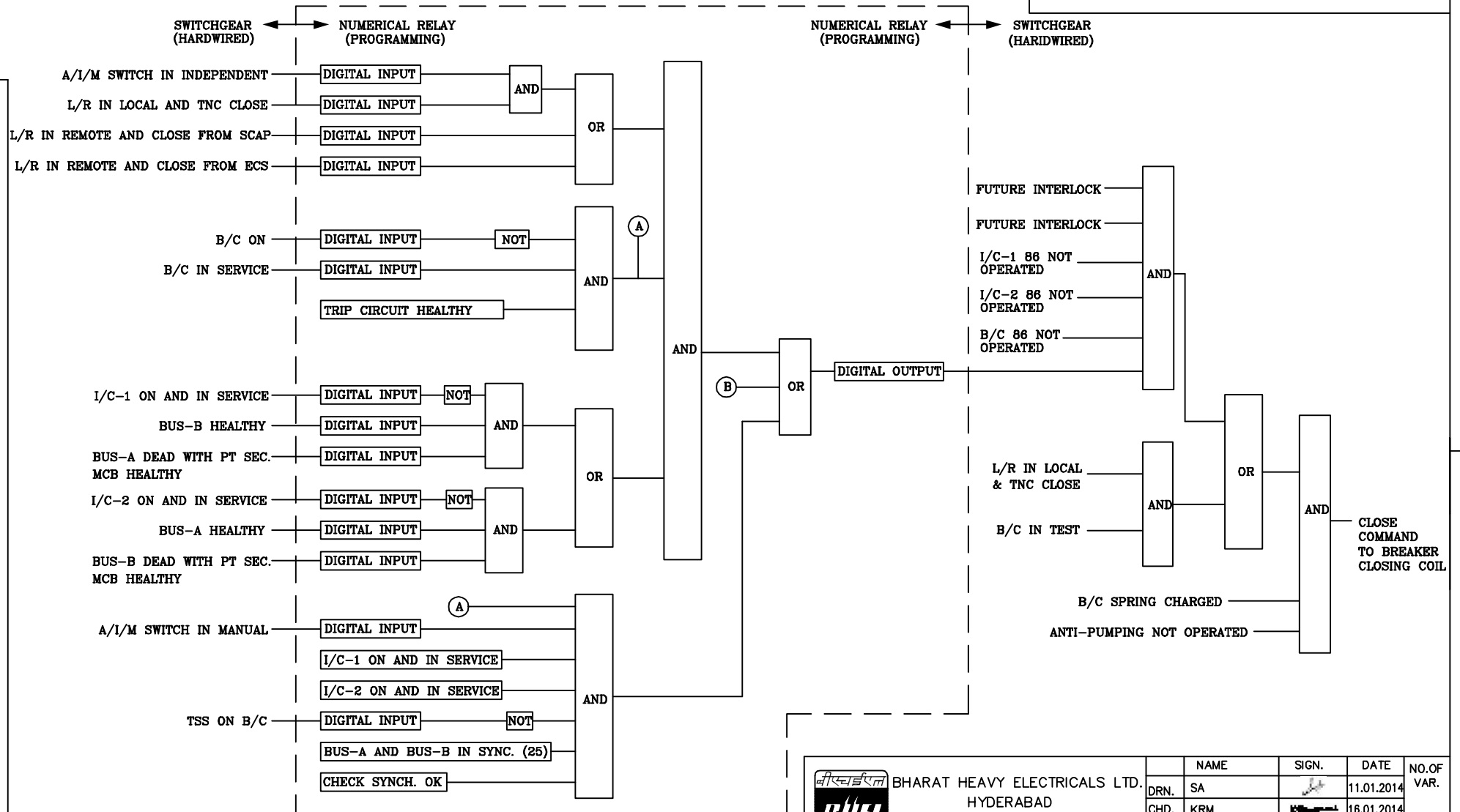
DEPT.	UNTOL. DIMS. GR.	SCALE	WEIGHT (KG)
CODE	C/M/F		
TITLE			
LT SWITCHBOARD SCHEMES			
STANDARDISED LOGICS			

CARD CODE
N.A.DRAWING NO.
PEEC-04519REV.
00

(ALL DIMENSIONS ARE IN mm)

DRG. NO. PEEC-04519

SH. 06 OF 14



 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD						NAME		SIGN.		DATE		NO.OF VAR.
					DRN.	SA				11.01.2014		
					CHD.	KRM				16.01.2014		
					APPD.	BCM				20.01.2014		—N.A.—
DEPT.	UNTOL. DIMS. GR. G/M/F		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG. —N.A.—			ITEM NO. —N.A.—	NO.OF ITEMS —N.A.—			
CODE					CARD CODE	DRAWING NO. PEEC—04519				REV. 00		
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS					N.A.	SHT. No		06	NO. OF SHT.		14	

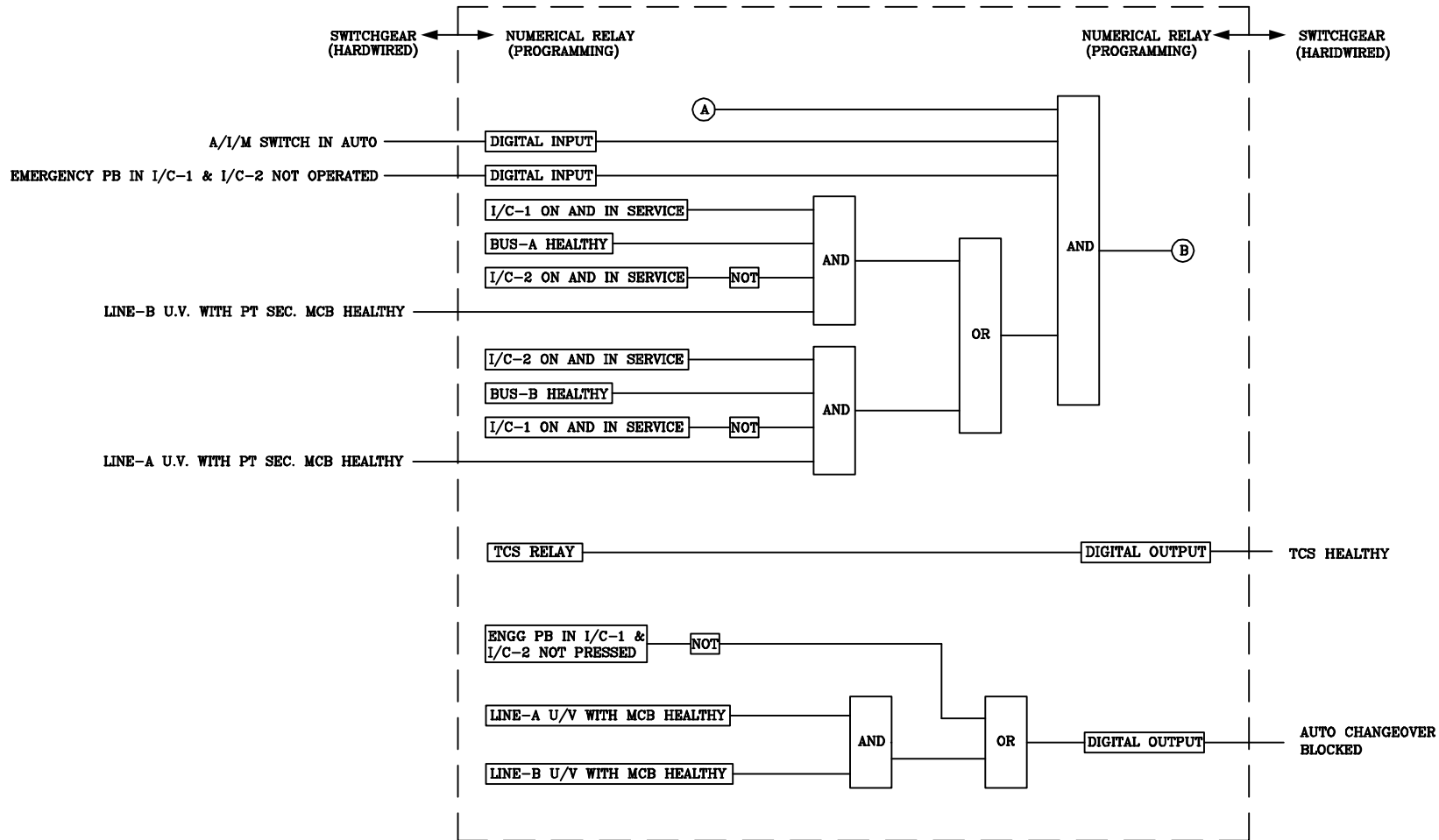
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

ACB B/C

DRG. NO. PEEC-04519

SH. 07 OF 14



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		
								

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD						NAME	SIGN.	DATE	NO. OF VAR.
					DRN.	SA		11.01.2014	
					CHD.	KRM		16.01.2014	
					APPD.	BCM		20.01.2014	
DEPT.	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO. OF ITEMS	
CODE	G/M/F				-N.A.-		-N.A.-	-N.A.-	
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS					CARD CODE N.A.	DRAWING NO.			REV. 00
						PEEC-04519			
						SHT. No 07		NO. OF SHT. 14	

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

ACB B/C

DRG. NO. PEEC-04519

SH. 08 OF 14

SWITCHGEAR
(HARDWIRED)NUMERICAL RELAY
(PROGRAMMING)NUMERICAL RELAY
(PROGRAMMING)SWITCHGEAR
(HARDWIRED)

FAULT PROT.

TRIP FROM SCAP

DIGITAL INPUT

TRIP FROM ECS

DIGITAL INPUT

I/C-1 ON AND IN SERVICE

NOT

DEAD BUS TRIP

I/C-2 ON AND IN SERVICE

NOT

DEAD BUS TRIP

OR

DIGITAL OUTPUT

TSS ON B/C

B/C ON

B/C IN SERVICE

I/C-1 ON AND IN SERVICE

I/C-2 ON AND IN SERVICE

AND

TIMER

(0-5)SEC.
SET AT 3SEC.

86 OPERATED TRIP

FUTURE TRIP

FUTURE TRIP

FUTURE TRIP

FUTURE TRIP

B/C IN SERVICE

TNC TRIP

B/C ON

TRIP COMMAND
TO BREAKER
TRIPPING COIL

FAULT PROT.

DIGITAL OUTPUT

TO 86

RELAY WATCH DOG

DIGITAL OUTPUT

I/C-1 ON AND IN SERVICE

I/C-2 ON AND IN SERVICE

B/C ON

B/C IN SERVICE

AND

TIMER
SET AT 5 SEC.

DIGITAL OUTPUT

CONTINUOUS PARALLELING

B/C ON

B/C IN SERVICE

AND

DIGITAL OUTPUT

TO I/C-1

DIGITAL OUTPUT

TO I/C-2

BUS-A DEAD WITH PT SEC. MCB HEALTHY

BUS-B DEAD WITH PT SEC. MCB HEALTHY

AND

DIGITAL OUTPUT

REALISING AUTO CLOSING
LOGIC OF DCELDB I/CBHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO. OF VAR.
DRN.	SA		11.01.2014	
CHD.	KRM		16.01.2014	
APPD.	BCM		20.01.2014	-N.A.-

COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

DEPT.	UNTOL. DIMS. GR.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
CODE	C/M/F			-N.A.-	-N.A.-	-N.A.-
TITLE				DRAWING NO.		REV.
LT SWITCHBOARD SCHEMES STANDARDISED LOGICS				PEEC-04519		00
				SHT. No 08	No. OF SHT. 14	

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

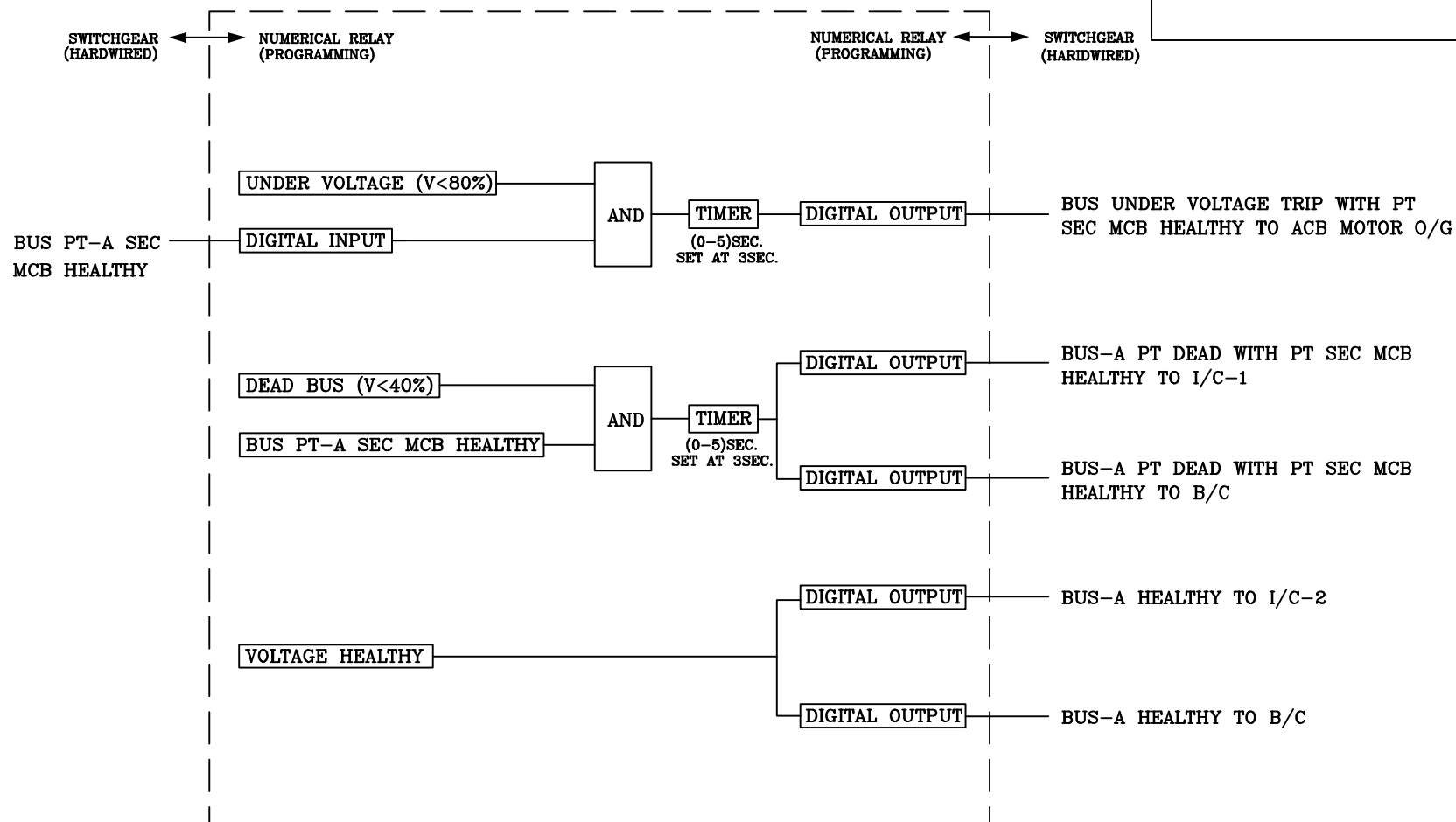
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

BUS-A PT

DRG. NO. PEEC-04519

SH. 09 OF 14



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED	
		CHD/APPD				CHD/APPD				CHD/APPD	
ZONE				ZONE				ZONE			

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					NAME	SIGN.	DATE	NO.OF VAR.
				DRN.	SA		11.01.2014	
				CHD.	KRM		16.01.2014	
				APPD.	BCM		20.01.2014	
—N.A.—								
DEPT.	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS
CODE	C/M/F				—N.A.—		—N.A.—	—N.A.—
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS				CARD CODE	DRAWING NO. PEEC-04519			REV. 00
				N.A.	SHT. No 09		No. OF SHT.	14

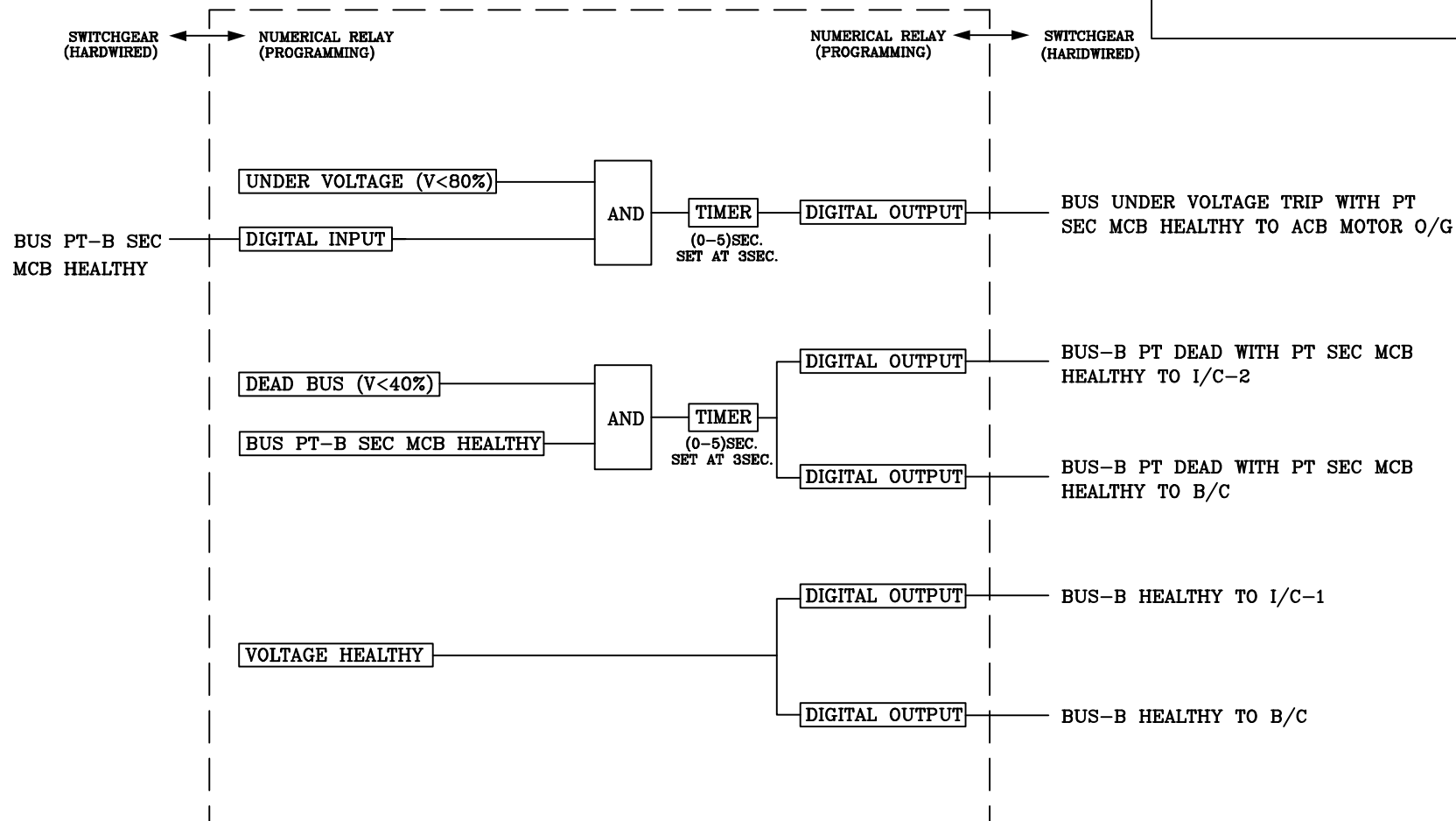
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

BUS-B PT

DRG. NO. PEEC-04519

SH. 10 OF 14



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD				NAME		SIGN.	DATE	NO.OF VAR.
				DRN.	SA		11.01.2014	
				CHD.	KRM		16.01.2014	
				APPD.	BCM		20.01.2014	
DEPT.		UNTOL. DIMS. GR. C/M/F		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-
CODE								
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS					CARD CODE N.A.	DRAWING NO. PEEC-04519		REV. 00
					SHT. No.	10	NO. OF SHT.	14

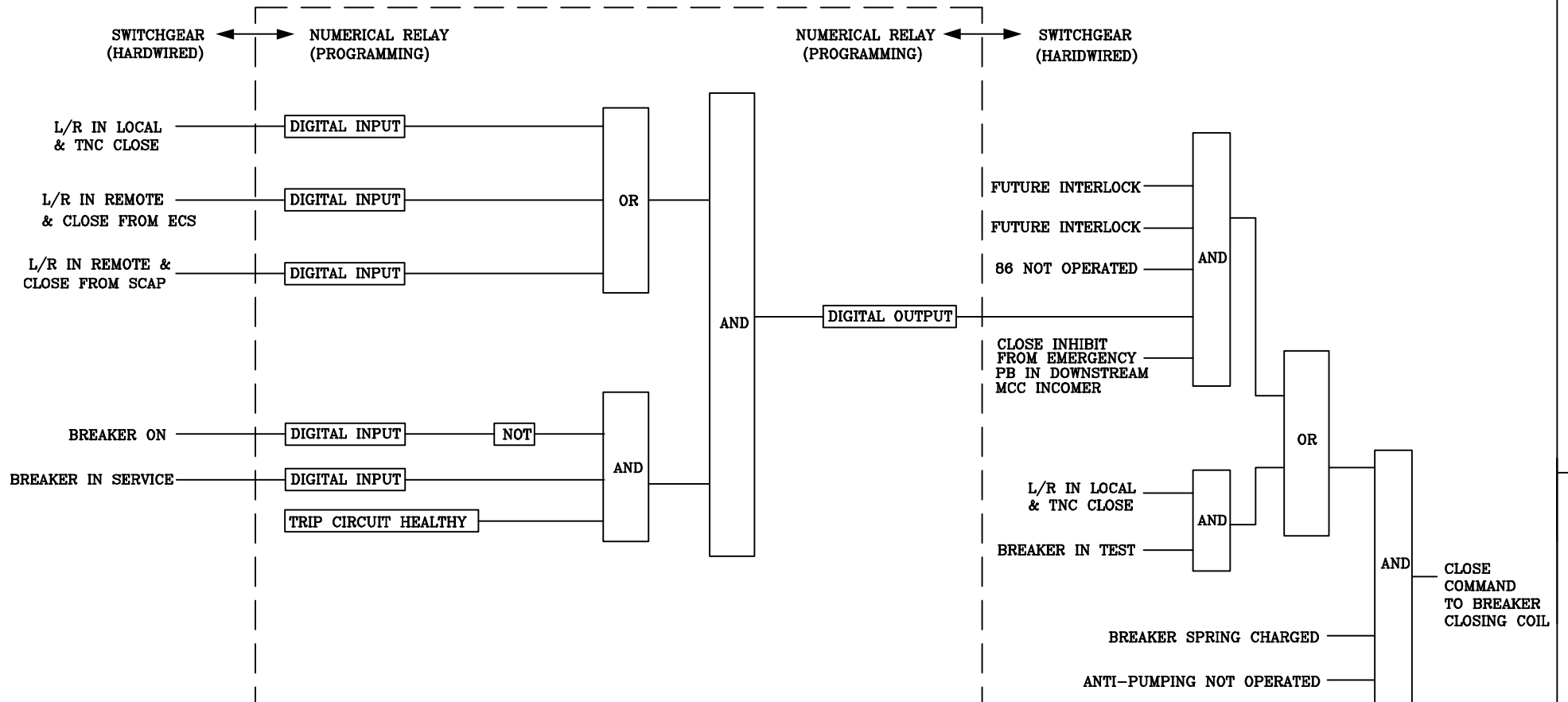
(ALL DIMENSIONS ARE IN mm)

ACB NON-MOTOR 0/G

PEEC-04519

DRG. NO.

SH. 11 OF 14



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
D. DRN.	SA		11.01.2014	
CHD.	KRM		16.01.2014	
APPD.	BCM		20.01.2014	-N.A.-
GHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS
	-N.A.-		-N.A.-	-N.A.-
CARD CODE	DRAWING NO. PEEC-04519			REV. 00
N.A.	SHT. No 11		NO. OF SHT. 14	

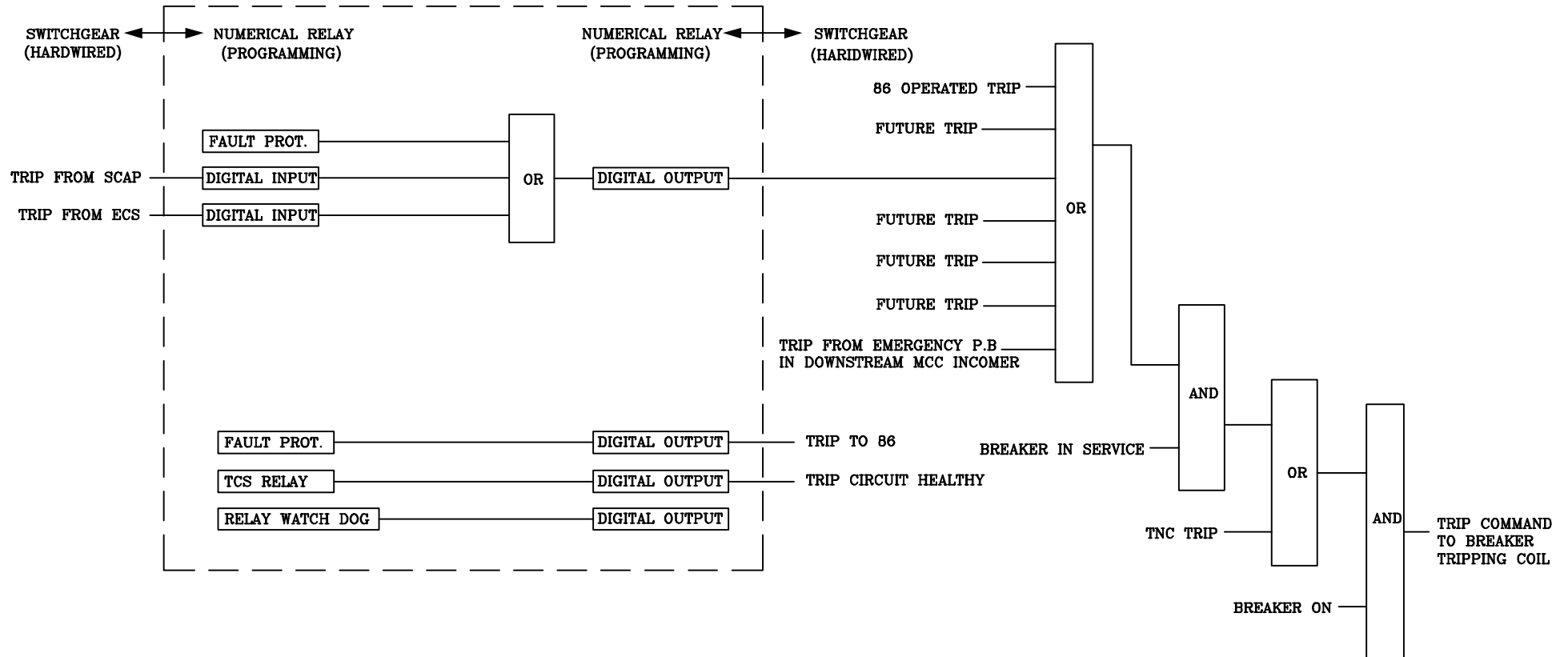
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

ACB NON-MOTOR O/G

DRG. NO. PEEC-04519

SH. 12 OF 14



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

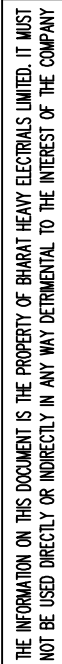
REV.	DATE	ZONE	ALTERED	CHD/APPD	REV.	DATE	ZONE	ALTERED	CHD/APPD

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					NAME	SIGN.	DATE	NO. OF VAR.
				DRN.	SA		11.01.2014	-N.A.-
				CHD.	KRM		16.01.2014	
				APPD.	BCM		20.01.2014	
DEPT.	UNTOL. DIMS. GR. G/M/F		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.		ITEM NO.	NO. OF ITEMS
CODE					-N.A.-		-N.A.-	-N.A.-
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS					CARD CODE	DRAWING NO.		REV.
						PEEC-04519		00
						SHT. No 12		NO. OF SHT 14

(ALL DIMENSIONS ARE IN mm)

DRG. NO. PEEC-04519

SH. 13 OF 14



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD						NAME	SIGN.	DATE	NO.OF VAR.
					DRN.	SA		11.01.2014	-N.A.-
					CHD.	KRM		16.01.2014	
					APPD.	BCM		20.01.2014	
DEPT.	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO.OF ITEMS -N.A.-		
CODE	G/M/F								
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS					CARD CODE N.A.	DRAWING NO. PEEC-04519		REV. 00	
						SHT. No 13		NO. OF SHT. 14	

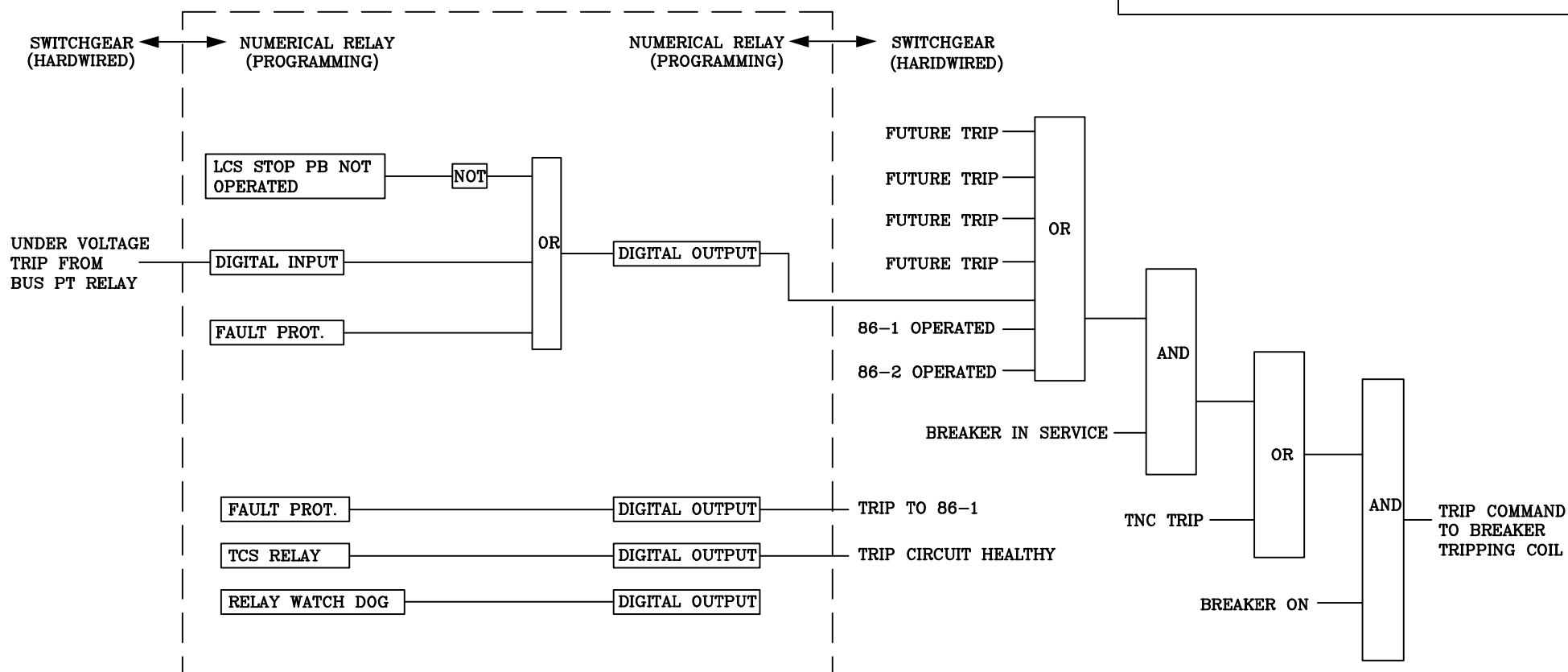
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

ACB MOTOR O/G

DRG. NO. PEEC-04519

SH. 14 OF 14



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED		REV.	DATE	ALTERED		REV.	DATE	ALTERED	
		CHD/APPD				CHD/APPD				CHD/APPD	
ZONE				ZONE				ZONE			

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					NAME	SIGN.	DATE	NO. OF VAR.
				DRN.	SA		11.01.2014	
				CHD.	KRM		16.01.2014	
				APPD.	BCM		20.01.2014	
DEPT.	UNTOL. DIMS. GR. G/M/F		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG. -N.A.-	ITEM NO. -N.A.-	NO. OF ITEMS -N.A.-	
CODE								
TITLE LT SWITCHBOARD SCHEMES STANDARDISED LOGICS					CARD CODE N.A.	DRAWING NO. PEEC-04519		REV. 00
					SHT. No	14	NO. OF SHT.	14

DRG. NO. PEEC-04712

SH. 01 OF 13

DRG. NO.

STANDARD HARDWIRED LOGICS FOR LT SWITCHBOARDS

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO.

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD.			CHD/APPD.			CHD/APPD.
ZONE			ZONE			ZONE		

 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		NAME		SIGN.	DATE	NO. OF VAR.	
		DRN.	DSTS	-sd-	18.03.2015		
		CHD.	K. RANGAMANI		18.03.2015		
		APPD.	B.C. MOHANTY		20.03.2015	-N.A.-	
DEPT.	UNTOL. DIMS. OR G/M/F		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEMS
CODE					-N.A.-	-N.A.-	-N.A.-
TITLE STANDARD HARDWIRED LOGICS FOR LT SWITCHBOARDS				CARD CODE	DRAWING NO.		REV.
				N.A.	PEEC-04712		00
SHT. No		01	NO. OF SHT.		13		

LEGEND SHEET

- I/C-1 - INCOMER-1
- I/C-2 - INCOMER-2
- B/C - BUS COUPLER
- L/R - LOCAL/REMOTE SELECTOR SWITCH
- TNC - TRIP/NEUTRAL/CLOSE SWITCH FOR BREAKER CONTROL
- A/I/M - AUTO/INDEPENDENT/MANUAL SELECTOR SWITCH
- PTSS - PT SELECTOR SWITCH
- TSS - TRIP SELECTOR SWITCH
- U/V - UNDER VOLTAGE
- E/F - EARTH FAULT
- CF - CONTROL FUSE
- DOL - DIRECT ON LINE
- LCS - LOCAL CONTROL STATION
- DCS - DISTRIBUTED CONTROL SYSTEM
- CBCT - CORE BALANCE CURRENT TRANSFORMER
- ELR - EARTH LEAKAGE RELAY
- OLR - OVER LOAD RELAY
- RTS - READY TO START
- RTC - READY TO CLOSE
- TS - TIME SWITCH
- ELCB - EARTH LEAKAGE CIRCUIT BREAKER
- 86 - MASTER TRIP RELAY
- 95 - TRIP CIRCUIT SUPERVISION RELAY
- 33T - BREAKER IN TEST
- 33S - BREAKER IN SERVICE
- 52A - BREAKER ON CONTACT
- 52B - BREAKER OFF CONTACT

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO. PEEC-04712

SH. 02 OF 13



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD
CODE
N.A.

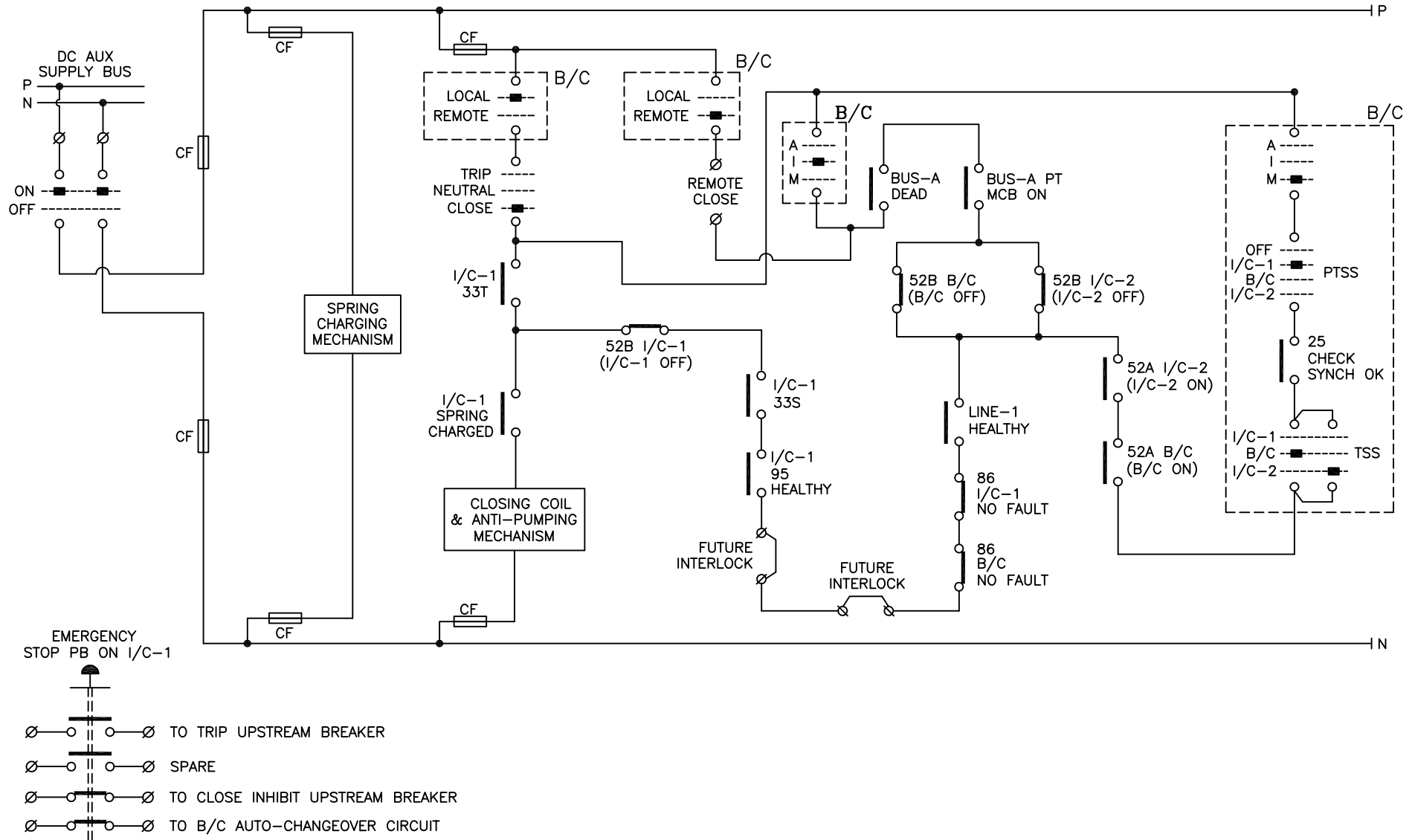
DRAWING NO.
PEEC-04712

REV.
00

SHT. No 02 NO. OF SHT. 13

DRG. NO. PEEC-04712 SH. 03 OF 13

CLOSING LOGIC FOR I/C-1 IN 2 I/Cs + 1 B/C SCHEME



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD CODE	DRAWING NO.	REV.
N.A.	PEEC-04712	00
SHT. No	03	NO. OF SHT. 13

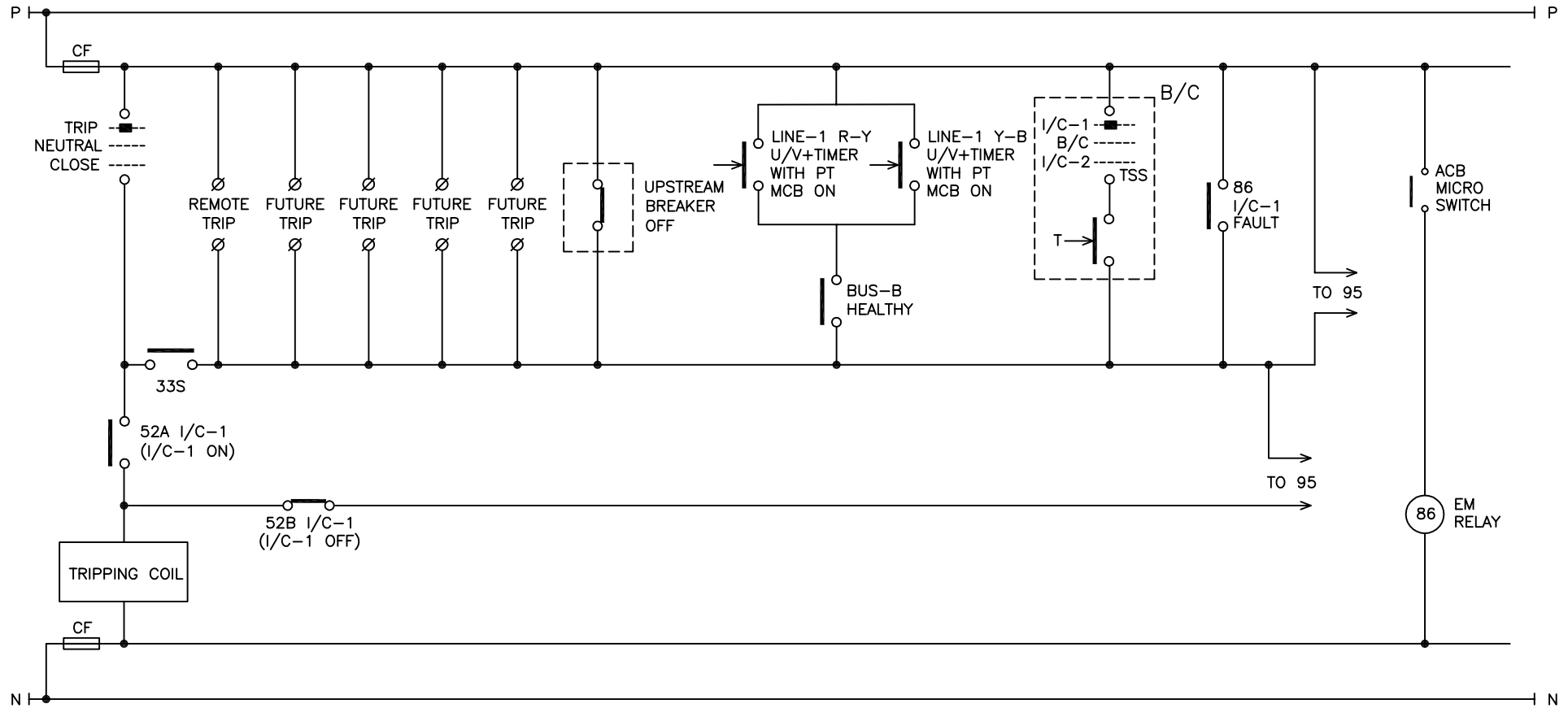
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. PEEC-04712

SH. 04 OF 13

TRIPPING LOGIC FOR I/C-1 IN 2 I/Cs + 1 B/C SCHEME



INVENTORY NO. _____

SIGN. AND DATE _____

REF. DRG. NO. _____

COMPUTER FILE NAME _____

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD CODE	DRAWING NO.	REV.
N.A.	PEEC-04712	00
SHT. No	04	NO. OF SHT.
		13

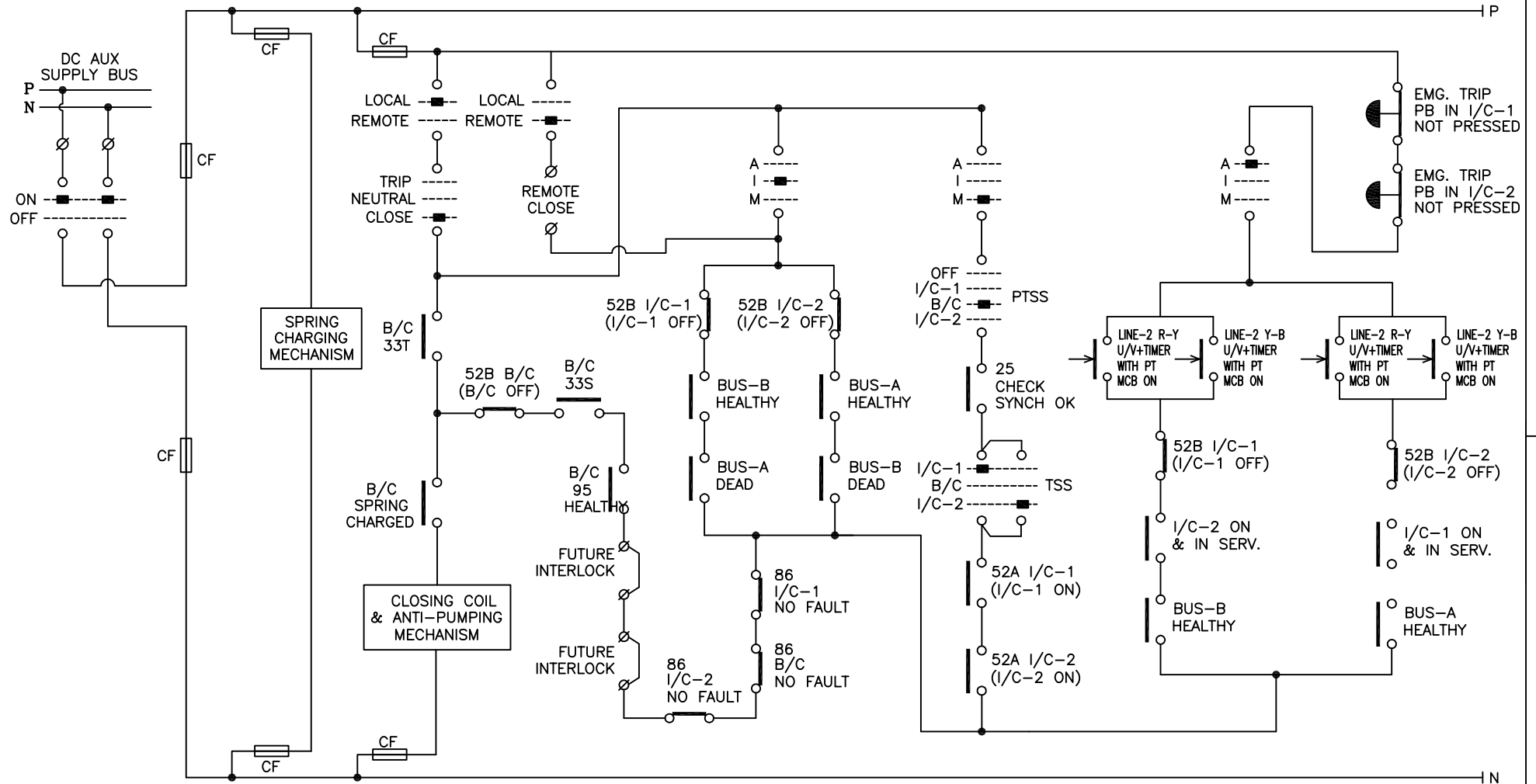
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. PEEC-04712

SH. 05 OF 13

CLOSING LOGIC FOR B/C IN 2 I/Cs + 1 B/C SCHEME



COMPUTER FILE NAME

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

BHARAT HEAVY ELECTRICALS LTD.
HYDERABADTITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDSCARD
CODE
N.A.DRAWING NO.
PEEC-04712REV.
00

SHT. No 05

NO. OF SHT. 13

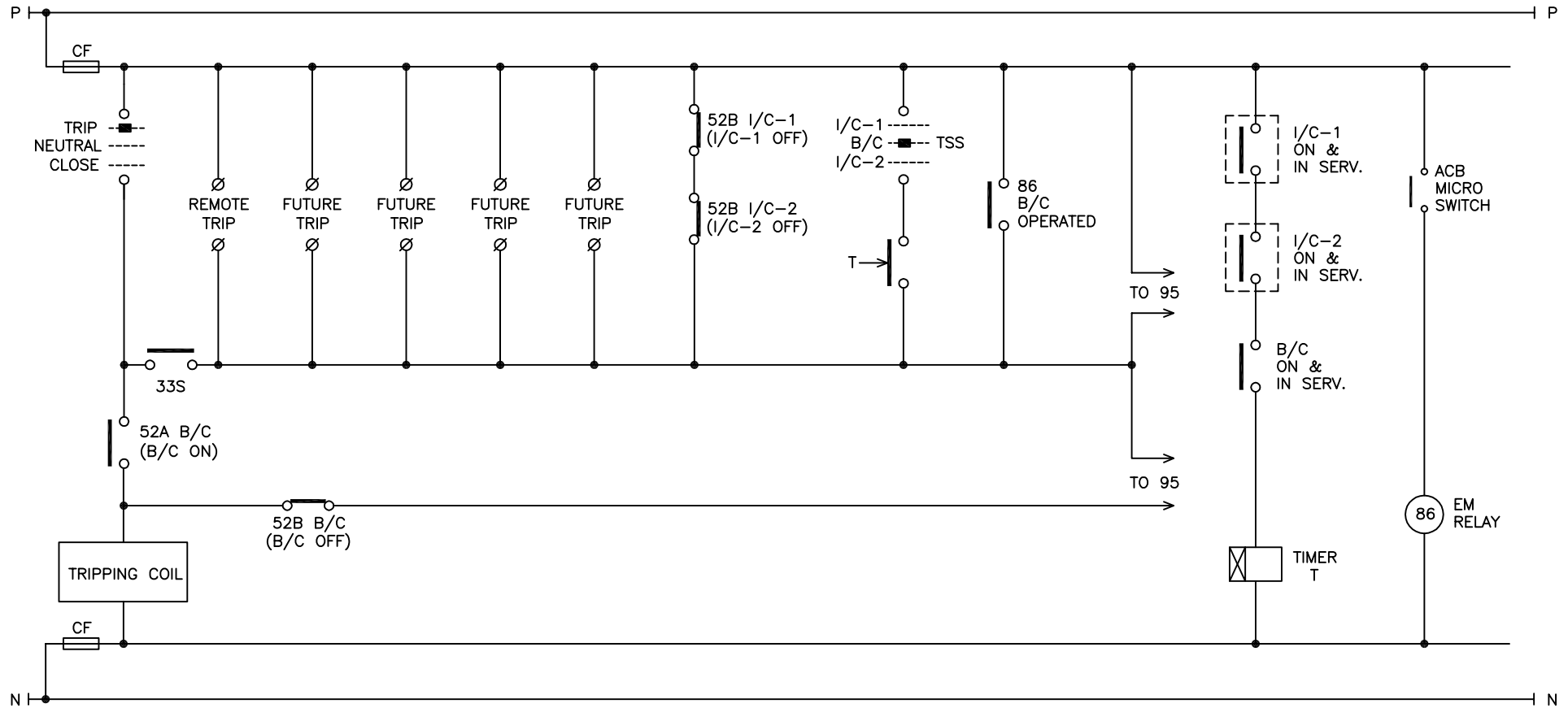
(ALL DIMENSIONS ARE IN mm)

PEEC-04712

DRG. NO.

SH. 06 OF 13

TRIPPING LOGIC FOR B/C IN 2 I/Cs + 1 B/C SCHEME



THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

-----COMPUTER FILE NAME-----

SIGN. AND DATE | REF. | DRG. NO. |

INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD CODE	N.A.
--------------	------

DRAWING NO.	PEEC-04712
-------------	------------

REV.
00

SHT. No	06	NO. OF SHT.	13
---------	----	-------------	----

DRG. NO. PEEC-04712

SH. 07 OF 13

NOTES, INDICATIONS & FEEDBACKS FOR I/Cs & B/C IN 2 I/Cs + 1 B/C SCHEME

NOTES:

1. POWER CIRCUIT AND ITS COMPONENTS LIKE CTs, PTs, METERS, TRANSDUCERS ETC. SHALL BE AS PER THE SWITCHBOARD BHEL SLD.
2. L/R SWITCH SHALL HAVE MINIMUM 3 POLES FOR EACH POSITION.
3. A/I/M SWITCH SHALL HAVE MINIMUM MINIMUM 3 POLES FOR EACH POSITION.
4. TNC SWITCH SHALL HAVE 2 POLES EACH FOR TRIP AND CLOSE POSITIONS.
5. TSS SHALL HAVE MINIMUM 3 POLES FOR EACH POSITION.
6. PTSS SHALL HAVE 4 POSITIONS I.E. OFF, I/C-1, I/C-2 & B/C AND SHALL HAVE MINIMUM 5 POLES EACH FOR I/C-1, I/C-2 & B/C POSITIONS.
7. EMERGENCY STOP PB PROVIDED IN I/C SHALL BE MUSHROOM HEAD, STAYPUT TYPE LOCKABLE WITH 2NO+2NC CONTACTS WIRED TO TB AS SHOWN.
8. SETTING OF RELAYS : U/V<80%, DEAD<40% & HEALTHY>80%.
9. WIRING AND LOGICS FOR I/C-2 WILL BE SIMILAR TO I/C-1.
10. FOR BREAKER ON & OFF CONTACTS USED IN LOGICS, BREAKER AUXILIARY CONTACTS SHALL BE USED. IF THESE CONTACTS ARE NOT SUFFICIENT, MULTIPLICATION SHALL BE DONE USING 52X AUXILIARY RELAY ONLY.
11. READY TO CLOSE (RTC) FEEDBACK FOR I/Cs SHALL BE GENERATED BY CHECKING THE CONDITIONS OF L/R IN R, BREAKER OFF & IN SERVICE, BREAKER SPRING CHARGED, 95 HEALTHY, 86 NOT OPERATED AND LINE VOLTAGE HEALTHY.
12. READY TO CLOSE (RTC) FEEDBACK FOR B/C SHALL BE GENERATED BY CHECKING THE SAME CONDITIONS AS IN I/Cs EXCEPT THE CONDITION OF LINE VOLTAGE HEALTHY.
13. INPUTS TO 95 RELAY SHALL BE TAKEN ONLY AFTER LOOPING OF ALL THE BREAKER TRIPPING CONTACTS/PATHS.

INDICATION LAMPS FOR I/C:

1. BREAKER ON (RED)
2. BREAKER OFF (GREEN)
3. BREAKER TRIP (AMBER)
4. TRIP CIRCUIT HEALTHY (WHITE)
5. BREAKER SPRING CHARGED (BLUE)
6. BREAKER IN SERVICE (WHITE)
7. BREAKER IN TEST (YELLOW)
8. UPSTREAM BREAKER ON (RED)
9. UPSTREAM BREAKER OFF (GREEN)

INDICATION LAMPS FOR B/C:

1. BREAKER ON (RED)
2. BREAKER OFF (GREEN)
3. BREAKER TRIP (AMBER)
4. TRIP CIRCUIT HEALTHY (WHITE)
5. BREAKER SPRING CHARGED (BLUE)
6. BREAKER IN SERVICE (WHITE)
7. BREAKER IN TEST (YELLOW)
8. DC SOURCE-1 HEALTHY (RED)
9. DC SOURCE-2 HEALTHY (RED)
10. AC SOURCE-1 HEALTHY (RED)
11. AC SOURCE-2 HEALTHY (RED)
12. DC SUPPLY-1 FAIL (GREEN)
13. DC SUPPLY-2 FAIL (GREEN)

REMOTE SYSTEM FEEDBACKS & CONTROLS:

AS PER ELECTRICAL CONTROL PHILOSOPHY
AND I/O LIST

SPARE FEEDBACKS:

1. BREAKER ON
2. BREAKER OFF
3. BREAKER TRIPPED
4. TRIP CIRCUIT UNHEALTHY
5. BREAKER IN SERVICE
6. BREAKER IN TEST
7. READY TO CLOSE (RTC)

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

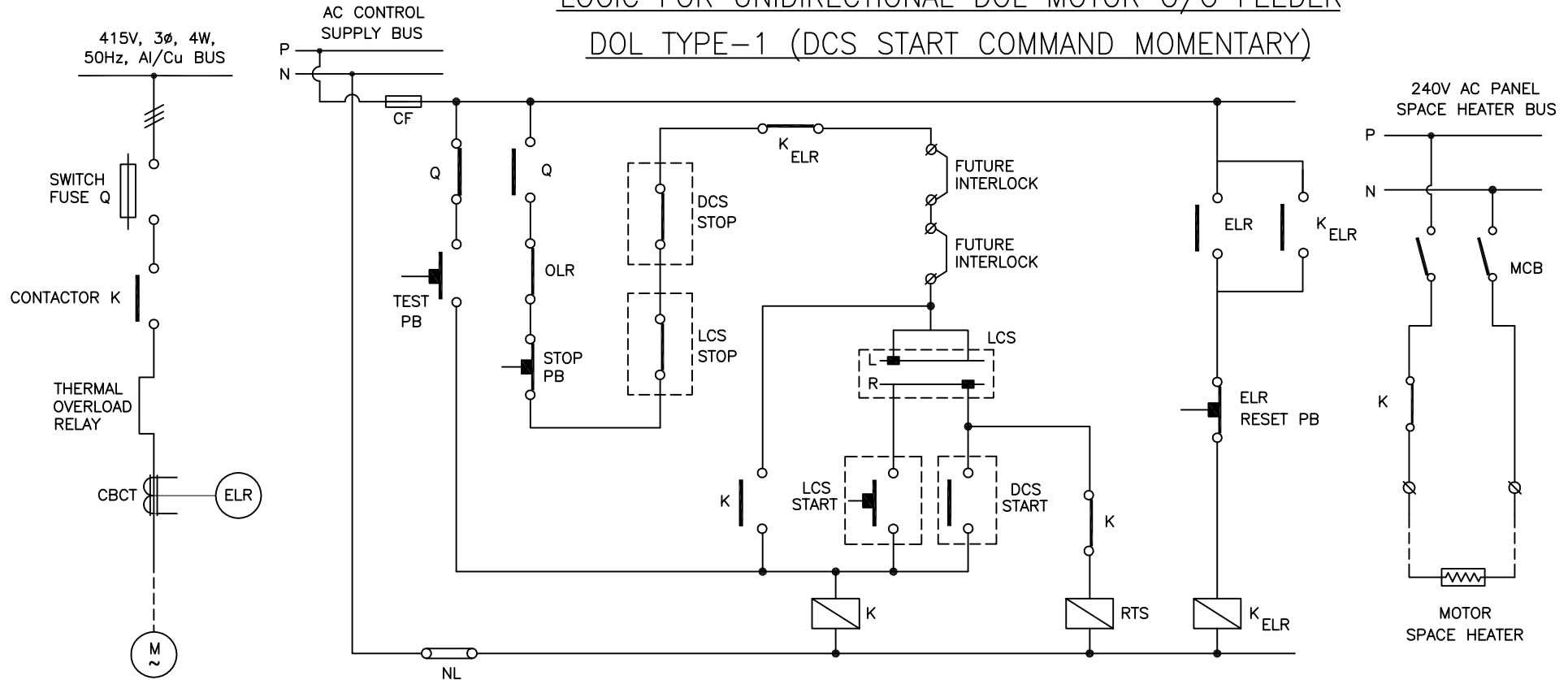


BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD CODE	DRAWING NO.	REV.
N.A.	PEEC-04712	00
SHT. No	07	NO. OF SHT. 13

LOGIC FOR UNIDIRECTIONAL DOL MOTOR O/G FEEDER DOL TYPE-1 (DCS START COMMAND MOMENTARY)



NOTES:

1. THE POWER CIRCUIT IS 3φ, 3W ALTHOUGH REPRESENTATION IS DONE USING ONE-LINE.
2. OTHER POWER CIRCUIT COMPONENTS LIKE CTs, METERS, TRANSDUCERS ETC. SHALL BE AS PER THE SWITCHBOARD BHEL SLD.
3. DCS START COMMAND IS MOMENTARY TYPE.
4. TEST PB AND ELR RESET PB SHALL BE SPRING RETURN TYPE, BLACK COLOUR.
5. STOP PB SHALL BE SPRING RETURN TYPE, RED COLOUR.
6. MOTOR SPACE HEATER CIRCUIT WILL BE APPLICABLE FOR MOTOR RATINGS AS PER BHEL SLD.
7. CBCT+ELR WILL BE APPLICABLE FOR MOTOR RATINGS AS PER BHEL SLD.
8. DCS INTERFACES SHALL BE THROUGH MARSHALLING TB.

INDICATION LAMPS:

1. MOTOR ON (RED)
2. MOTOR OFF (GREEN)
3. MOTOR OLR TRIP (AMBER)
4. MOTOR ELR TRIP (AMBER)

FEEDBACKS TO DCS:

1. MOTOR ON
2. MOTOR OFF
3. MOTOR OLR OR ELR TRIP (CONTACTS TO BE CONNECTED IN PARALLEL)
4. READY TO START (RTS)
5. ANY OTHER FEEDBACK AS PER DRIVE CONTROL PHILOSOPHY

SPARE FEEDBACKS:

1. MOTOR ON
2. MOTOR OFF
3. MOTOR OLR OR ELR TRIP (CONTACTS TO BE CONNECTED IN PARALLEL)
4. READY TO START (RTS)



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD
CODE
N.A.

DRAWING NO.
PEEC-04712

REV.
00

SHT. No 08 NO. OF SHT. 13

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

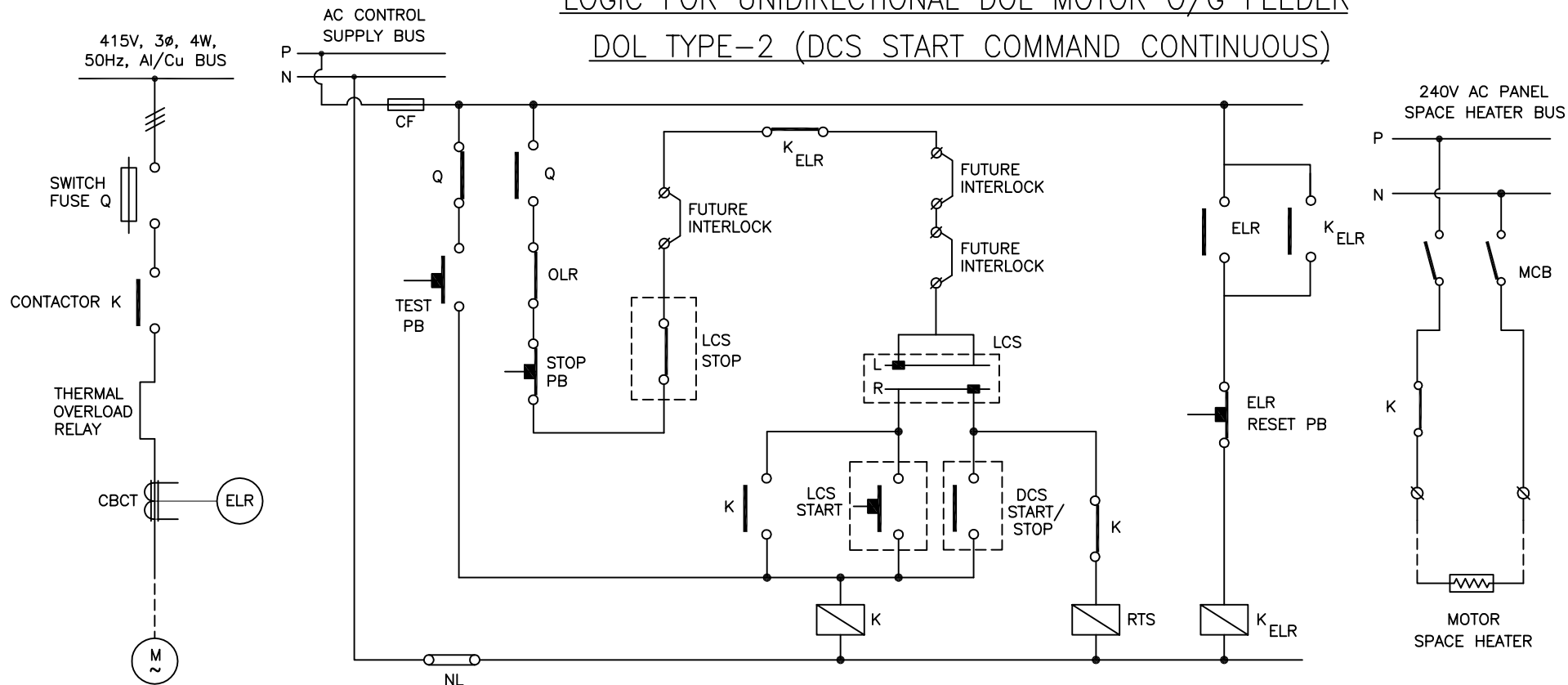
DRG. NO. PEEC-04712

SH. 08 OF 13

DRG. NO. PEEC-04712

SH. 09 OF 13

LOGIC FOR UNIDIRECTIONAL DOL MOTOR O/G FEEDER DOL TYPE-2 (DCS START COMMAND CONTINUOUS)



NOTES:

1. THE POWER CIRCUIT IS 30, 3W ALTHOUGH REPRESENTATION IS DONE USING ONE-LINE.
2. OTHER POWER CIRCUIT COMPONENTS LIKE CTs, METERS, TRANSDUCERS ETC. SHALL BE AS PER THE SWITCHBOARD BHEL SLD.
3. DCS START COMMAND IS CONTINUOUS TYPE.
4. TEST PB AND ELR RESET PB SHALL BE SPRING RETURN TYPE, BLACK COLOUR.
5. STOP PB SHALL BE SPRING RETURN TYPE, RED COLOUR.
6. MOTOR SPACE HEATER CIRCUIT WILL BE APPLICABLE FOR MOTOR RATINGS AS PER BHEL SLD.
7. CBCT+ELR WILL BE APPLICABLE FOR MOTOR RATINGS AS PER BHEL SLD.
8. DCS INTERFACES SHALL BE THROUGH MARSHALLING TB.

INDICATION LAMPS:

1. MOTOR ON (RED)
2. MOTOR OFF (GREEN)
3. MOTOR OLR TRIP (AMBER)
4. MOTOR ELR TRIP (AMBER)

FEEDBACKS TO DCS:

1. MOTOR ON
2. MOTOR OFF
3. MOTOR OLR OR ELR TRIP (CONTACTS TO BE CONNECTED IN PARALLEL)
4. READY TO START (RTS)
5. ANY OTHER FEEDBACK AS PER DRIVE CONTROL PHILOSOPHY

SPARE FEEDBACKS:

1. MOTOR ON
2. MOTOR OFF
3. MOTOR OLR OR ELR TRIP (CONTACTS TO BE CONNECTED IN PARALLEL)
4. READY TO START (RTS)



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD CODE	DRAWING NO.	REV.
N.A.	PEEC-04712	00
SHT. No	09	NO. OF SHT. 13

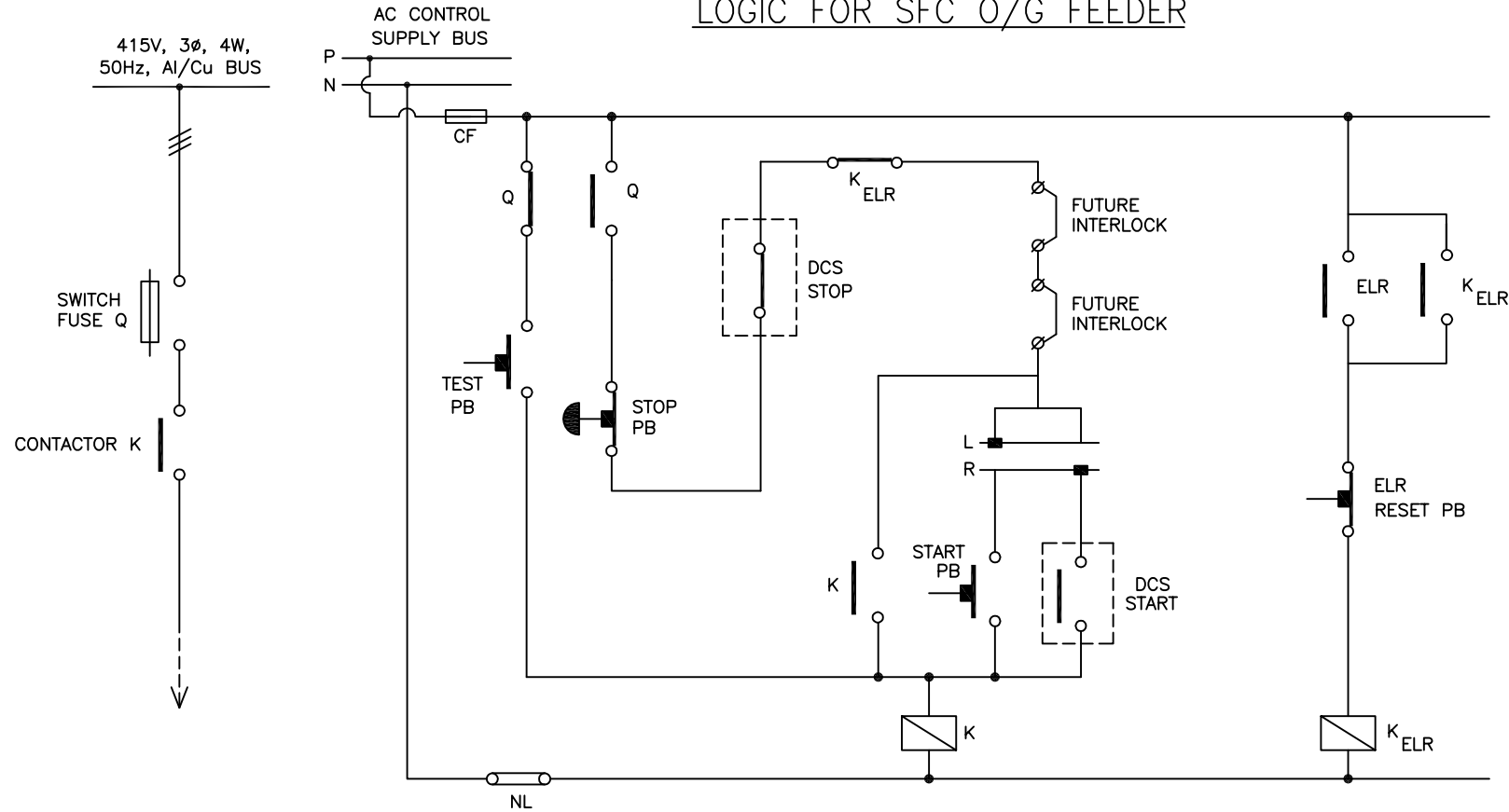
INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO. PEEC-04712

SH. 10 OF 13

LOGIC FOR SFC O/G FEEDER



NOTES:

1. THE POWER CIRCUIT IS 3φ, 3W ALTHOUGH REPRESENTATION IS DONE USING ONE-LINE.
2. OTHER POWER CIRCUIT COMPONENTS LIKE CTs, METERS, TRANSDUCERS ETC. SHALL BE AS PER THE SWITCHBOARD BHEL SLD.
3. DCS START COMMAND IS MOMENTARY TYPE.
4. TEST PB AND ELR RESET PB SHALL BE SPRING RETURN TYPE, BLACK COLOUR.
5. START PB SHALL BE SPRING RETURN TYPE, GREEN COLOUR.
6. STOP PB SHALL BE MUSHROOM HEAD STAYPUT TYPE, RED COLOUR.
7. CBCT+ELR WILL BE APPLICABLE FOR FEEDER RATINGS AS PER BHEL SLD.
8. DCS INTERFACES SHALL BE THROUGH MARSHALLING TB.

INDICATION LAMPS:

1. FEEDER ON (RED)
2. FEEDER OFF (GREEN)
3. FEEDER ELR TRIP (AMBER)

FEEDBACKS TO DCS:

1. FEEDER ON
2. FEEDER OFF
3. FEEDER ELR TRIP
4. ANY OTHER FEEDBACK AS PER DRIVE CONTROL PHILOSOPHY

SPARE FEEDBACKS:

1. FEEDER ON
2. FEEDER OFF
3. FEEDER ELR TRIP



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD
CODE
N.A.

DRAWING NO.
PEEC-04712

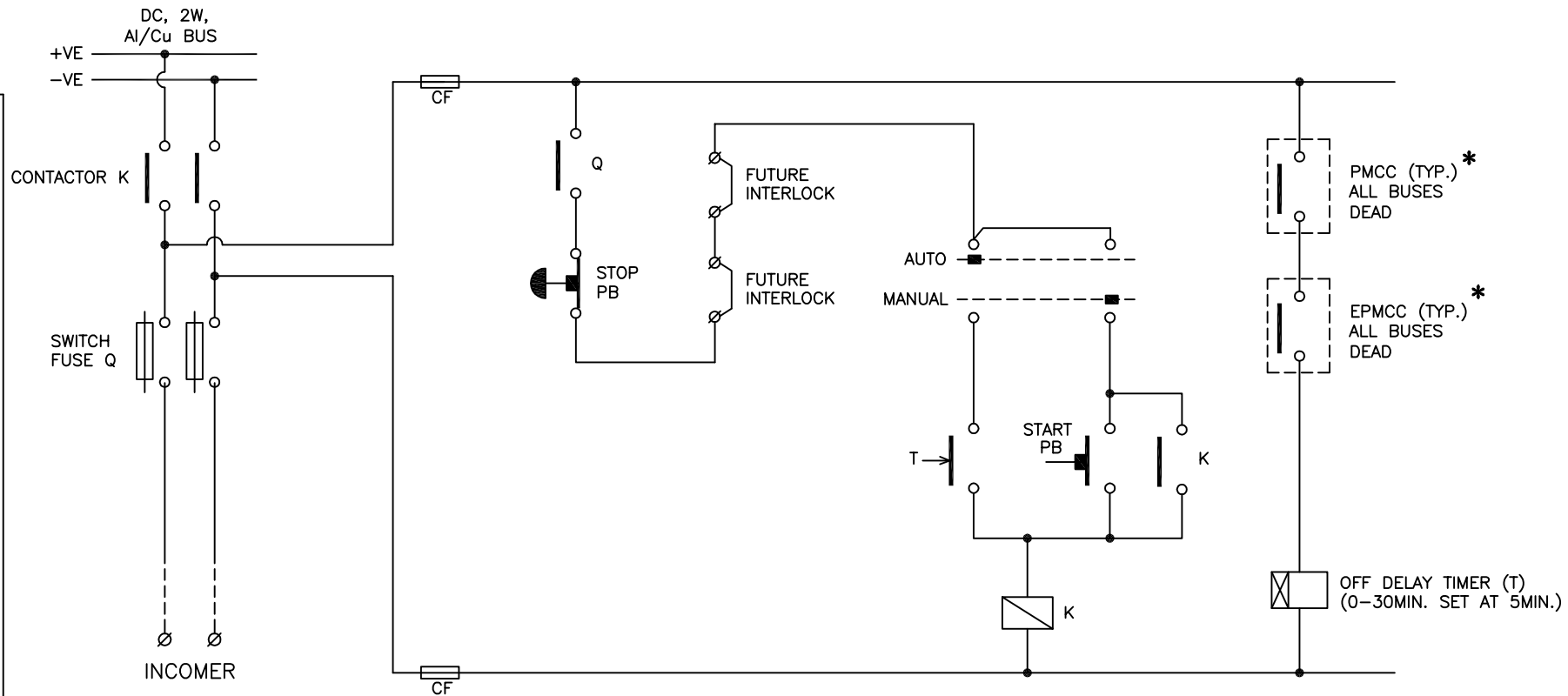
REV.
00

SHT. No 10 NO. OF SHT. 13

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

LOGIC FOR DCELDDB INCOMER



NOTES:

1. POWER CIRCUIT COMPONENTS LIKE METERS, TRANSDUCERS ETC. SHALL BE AS PER THE SWITCHBOARD BHEL SLD.
2. STOP PB SHALL BE MUSHROOM HEAD STAYPUT TYPE, RED COLOUR.
3. START PB SHALL BE SPRING RETURN TYPE, GREEN COLOUR.
- * 4. "ALL BUSES DEAD" OF THE SWITCHBOARDS WHICH ARE FEEDING SUPPLY TO MLDB AND ACELDDB SHALL BE CONSIDERED.

INDICATION LAMPS:

1. INCOMER ON (RED)
2. INCOMER OFF (GREEN)

SPARE FEEDBACKS:

1. INCOMER ON
2. INCOMER OFF
3. INCOMER U/V RELAY CONTACTS
4. INCOMER E/F RELAY CONTACTS

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD
CODE
N.A.

DRAWING NO.
PEEC-04712

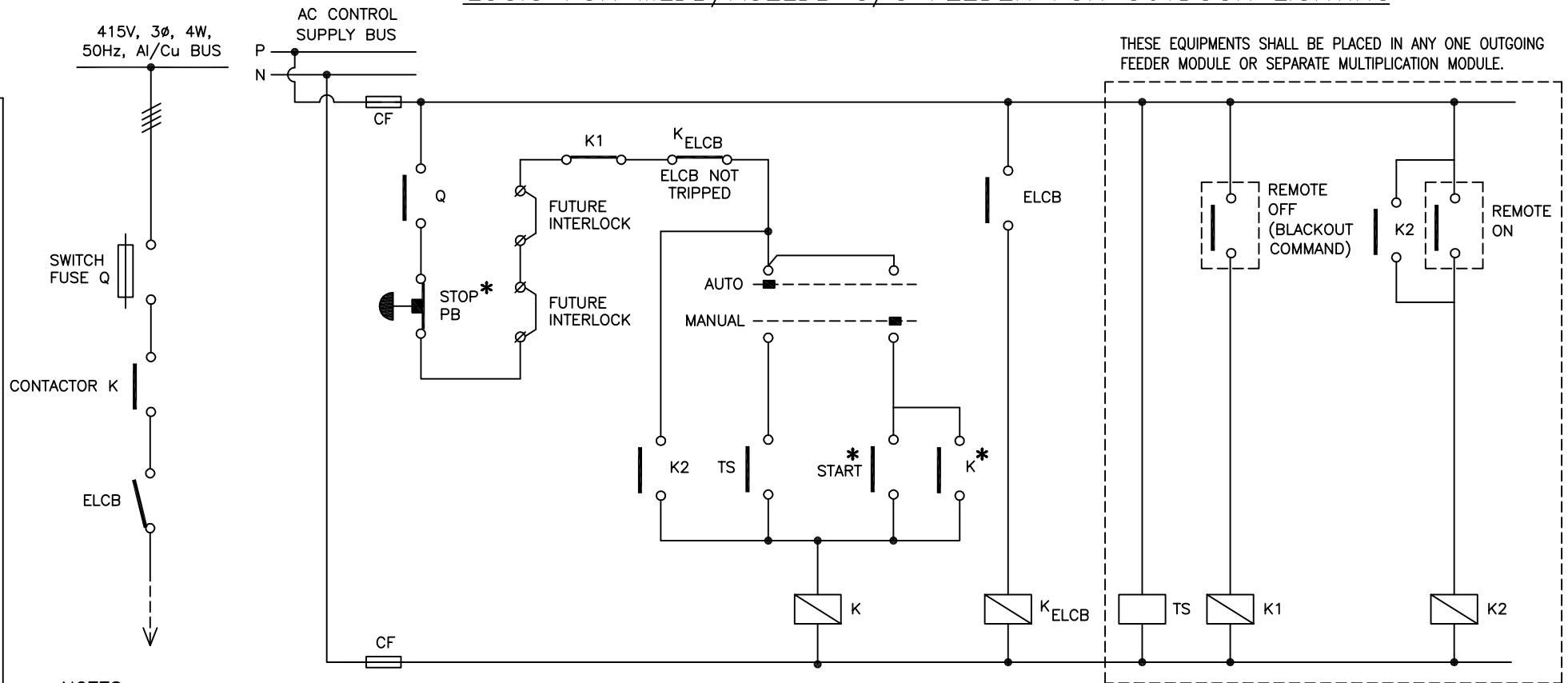
REV.
00

SHT. No 11 NO. OF SHT. 13

DRG. NO. PEEC-04712

SH. 12 OF 13

LOGIC FOR MLDB/ACELDB O/G FEEDER FOR OUTDOOR LIGHTING



NOTES:

1. POWER CIRCUIT COMPONENTS LIKE METERS, TRANSDUCERS ETC. SHALL BE AS PER THE SWITCHBOARD BHEL SLD.
- * 2. LOCAL START DEVICE MAY BE PB OR STAYPUT SWITCH, WHICH WILL BE DECIDED DURING DETAILED ENGINEERING. IN CASE, IT IS PB, THEN HOLDING CIRCUIT USING K SHALL BE PROVIDED AND STOP PB SHALL ALSO BE PROVIDED.
3. STOP PB, IF PROVIDED, SHALL BE MUSHROOM HEAD STAYPUT TYPE, RED COLOUR.
4. START PB, IF PROVIDED, SHALL BE SPRING RETURN TYPE, GREEN COLOUR.
5. REMOTE OFF I.E. BLACKOUT COMMAND SHALL BE STAYPUT TYPE.
6. ONE COMMAND EACH WILL BE PROVIDED FROM REMOTE FOR ON AND OFF (BLACKOUT). MULTIPLICATION SHALL BE DONE IN SWITCHBOARD FOR SIMULTANEOUS CLOSING AND TRIPPING OF ALL OUTGOING FEEDERS.

INDICATION LAMPS:

1. FEEDER ON (RED)
2. FEEDER OFF (GREEN)
3. FEEDER TRIP (AMBER)

SPARE FEEDBACKS:

1. FEEDER ON
2. FEEDER OFF
3. FEEDER TRIP



BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

TITLE
STANDARD HARDWIRED LOGICS
FOR LT SWITCHBOARDS

CARD
CODE
N.A.

DRAWING NO.
PEEC-04712

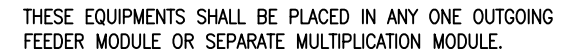
REV.
00

SHT. No 12 NO. OF SHT. 13

INVENTORY NO. SIGN. AND DATE REF. DRG. NO. COMPUTER FILE NAME THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO.	SH. 13 OF 13
PEEC-04712	



1. POWER CIRCUIT COMPONENTS LIKE METERS, TRANSDUCERS ETC. SHALL BE AS PER THE SWITCHBOARD BHEL SLD.
- * 2. LOCAL START DEVICE MAY BE PB OR STAYPUT SWITCH, WHICH WILL BE DECIDED DURING DETAILED ENGINEERING. IN CASE, IT IS PB, THEN HOLDING CIRCUIT USING K SHALL BE PROVIDED AND STOP PB SHALL ALSO BE PROVIDED.
3. STOP PB, IF PROVIDED, SHALL BE MUSHROOM HEAD STAYPUT TYPE, RED COLOUR.
4. START PB, IF PROVIDED, SHALL BE SPRING RETURN TYPE, GREEN COLOUR.

1. FEEDER ON (RED)
2. FEEDER OFF (GREEN)
3. FEEDER TRIP (AMBER)

1. FEEDER ON
2. FEEDER OFF
3. FEEDER TRIP