


A		B		C		D		E		F	
LIST OF DRAWINGS 145kV SF6 CIRCUIT BREAKER TYPE LTB145D1/B											
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Revision Details:											
Revision A 20181105											
END CUSTOMER : APTRANSCO											
COVER SHEET FOR 145kV SF6 CIRCUIT BREAKER TYPE LTB145D1/B WITH FSA1											
DRAWN: MB CHECKED: TT APPRD. UP											
ABB ABB India Limited											
145 kV CB TOTAL SH. 1 Sh. NO. 1											
Drawing approval subject to valid vendor registration											
APPROVED  CHIEF ENGINEER CONSTRUCTION APTRANSCO.											
SR. NO. REFERENCE DOCUMENT DESCRIPTION											
1 1HYB990147-0001 GENERAL ARRANGEMENT											
2 1HYB990147-0003 SCHEMATIC DIAGRAM											
3 1HYB990147-0006 OPERATING MECHANISM											
4 1HYB990147-0009 RATING PLATE											
5 1HYB990147-0013 LAYOUT ELECTRICAL COMPONENTS											
6 1HYB990147-0015 SUPPORT STRUCTURE											
7 1HYB990147-0204 SCHEMATIC DIAGRAM PLATE											
CLIENT APTRANSCO PO NO AS APPLICABLE CONTROL VOLTAGE CLOSE/TRIP 220 VDC SPRING DRIVE MOTOR VOLTAGE 240 VAC HEATER VOLTAGE 240 VAC ABB S.O. NO. AS APPLICABLE											
COMPUTER ORIGINAL											

1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8

Drawing approval subject to valid vendor registration

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Abhinav
CHIEF ENGINEER
CONSTRUCTION
APTRANSKO.

DIAGRAM BASED ON IEC 617-83.
LOCAL REMOTE SWITCH IN REMOTE POSITION.
CIRCUIT BREAKER IN "OFF" POSITION.
AUXILIARY CIRCUIT "OFF".
DRAWN WITHOUT GAS PRESSURE.
SPRING DISCHARGED.

NOTE :- WIRING TO BE DONE WITH CU.WIRE (GREY FOR DC CKT.
BLACK FOR AC CKT. , GREEN + YELLOW FOR EARTHING.)
1:- 2.5 SQ. MM. FOR CONTROL CKT.
2:- 2.5 SQ. MM. FOR MOTOR CKT.
3:- 4.0 SQ. MM. FOR DOOR & PANEL EARTHING .

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Revision	
A	20180922

END CUSTOMER : APTRANSKO

SCHEMATIC DIAGRAM FOR
145KV SF6 CIRCUIT BREAKER
TYPE LTB145D1/B WITH FSA1.

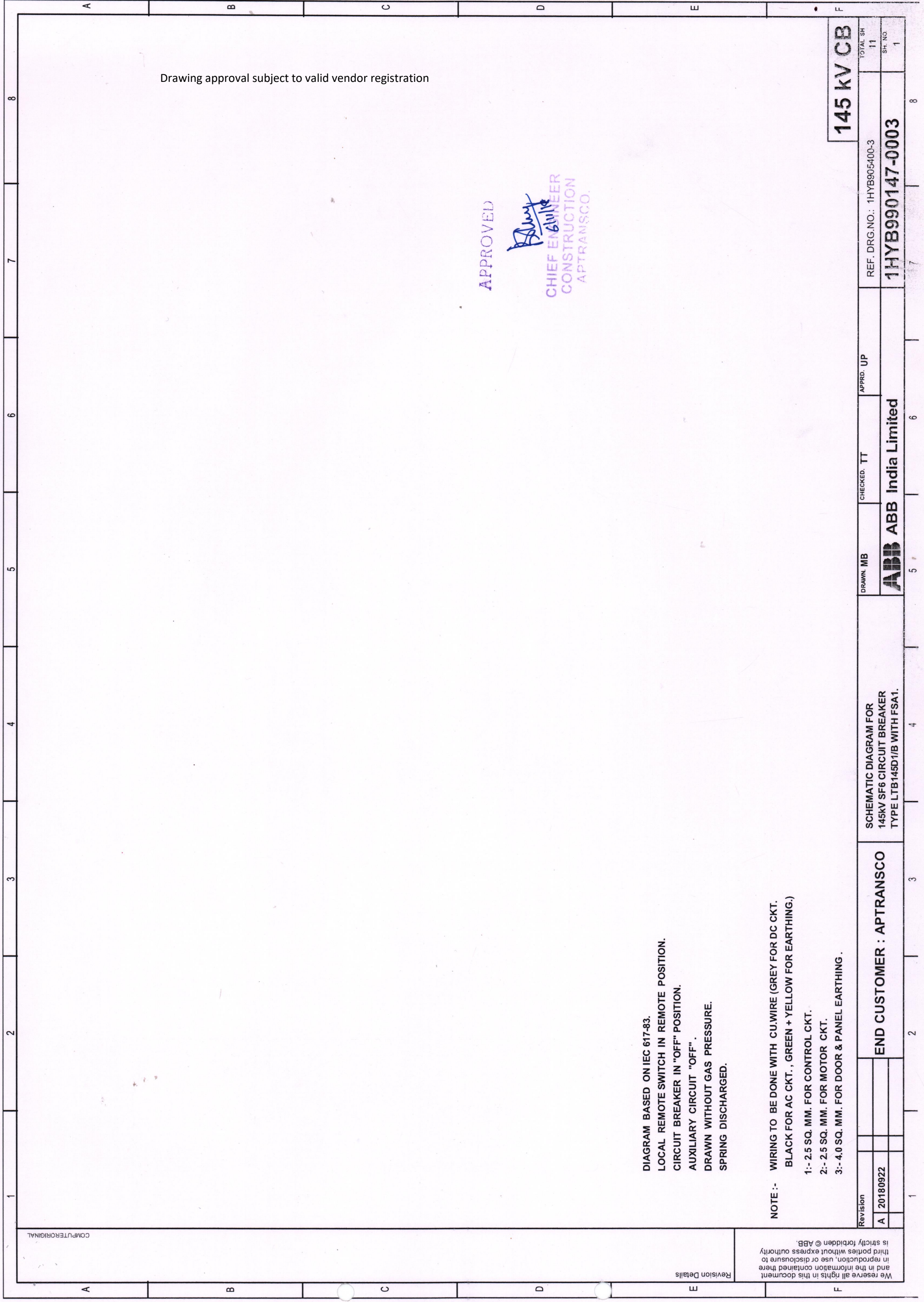
DRAWN MB
ABB ABB India Limited

CHECKED. TT
APPRD. UP

REF. DRG.NO.: 1HYB905400-3
1HYB990147-0003

145 KV CB

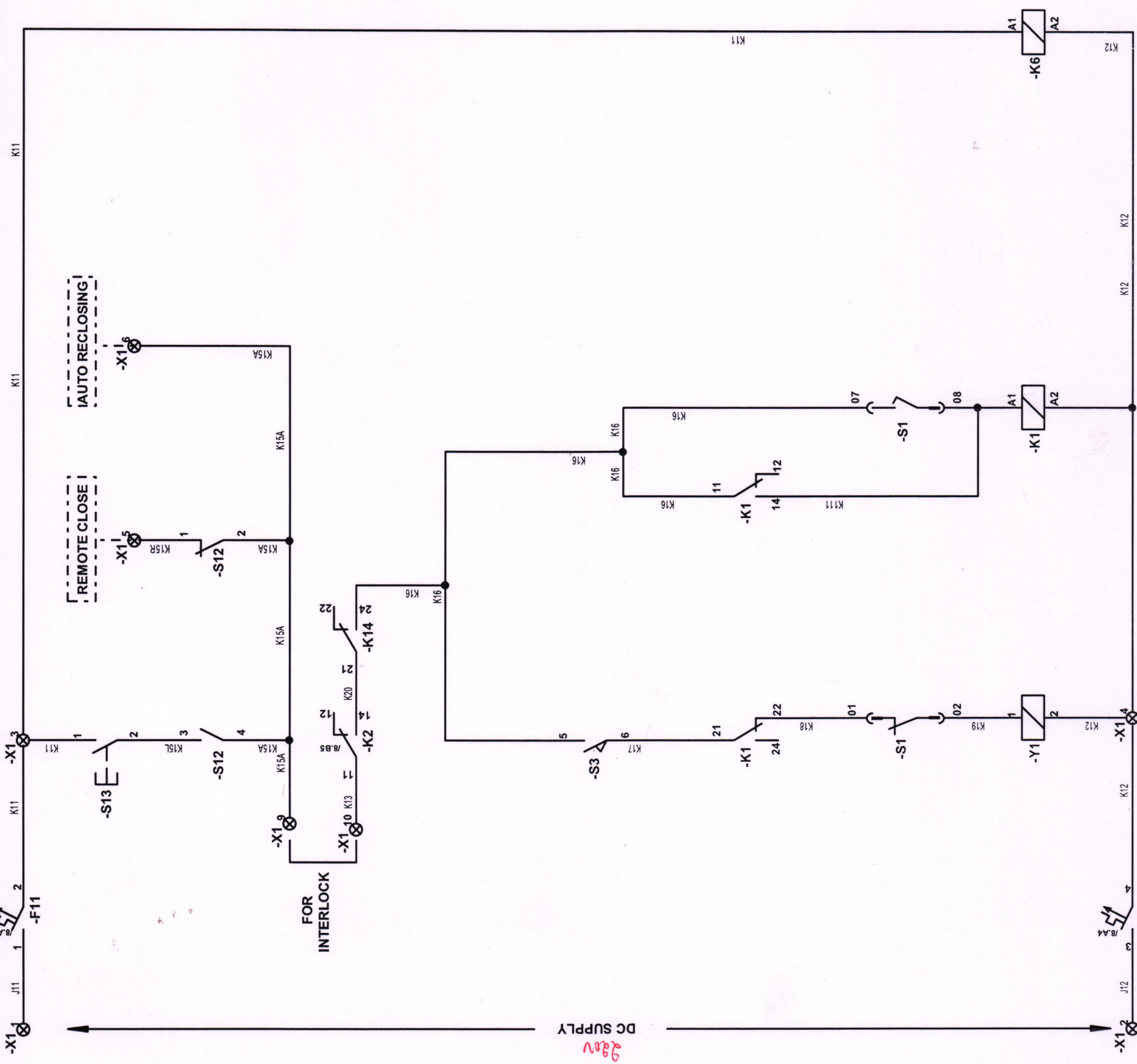
TOTAL SH	11
SH. NO	1



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 CONSTRUCTION
 APTRANSCO.

145 kV CB

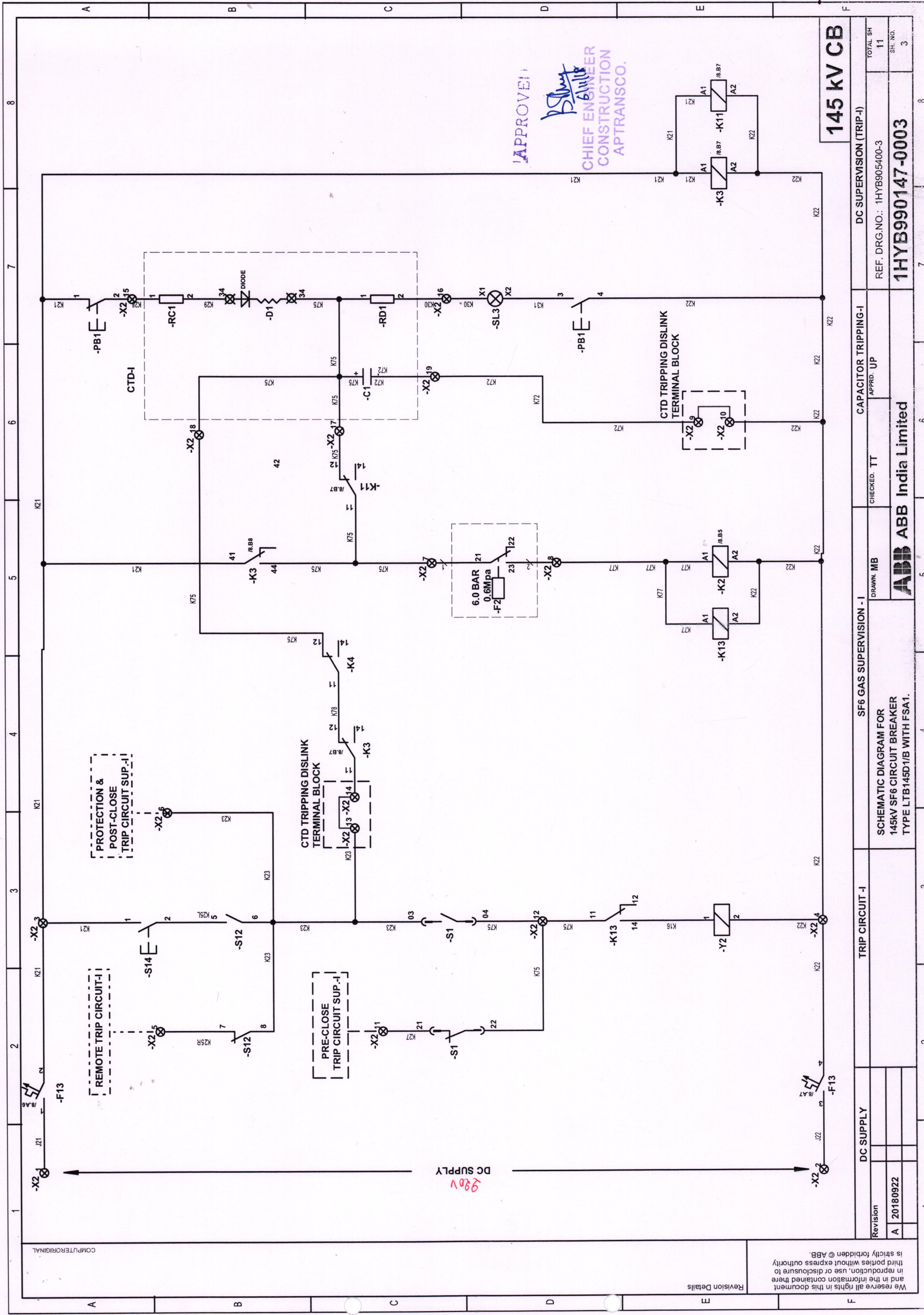


Revision		DC SUPPLY		CLOSING CIRCUIT		ANTI PUMPING		DC SUPERVISION (CLOSING)		TOTAL SH	
A	20180922							DRAWN: MB	CHECKED: TT	APPRD: UP	11
								ABB India Limited		REF. DRG. NO.: 1HYB905400-3	
								1HYB990147-0003		SH. NO. 2	

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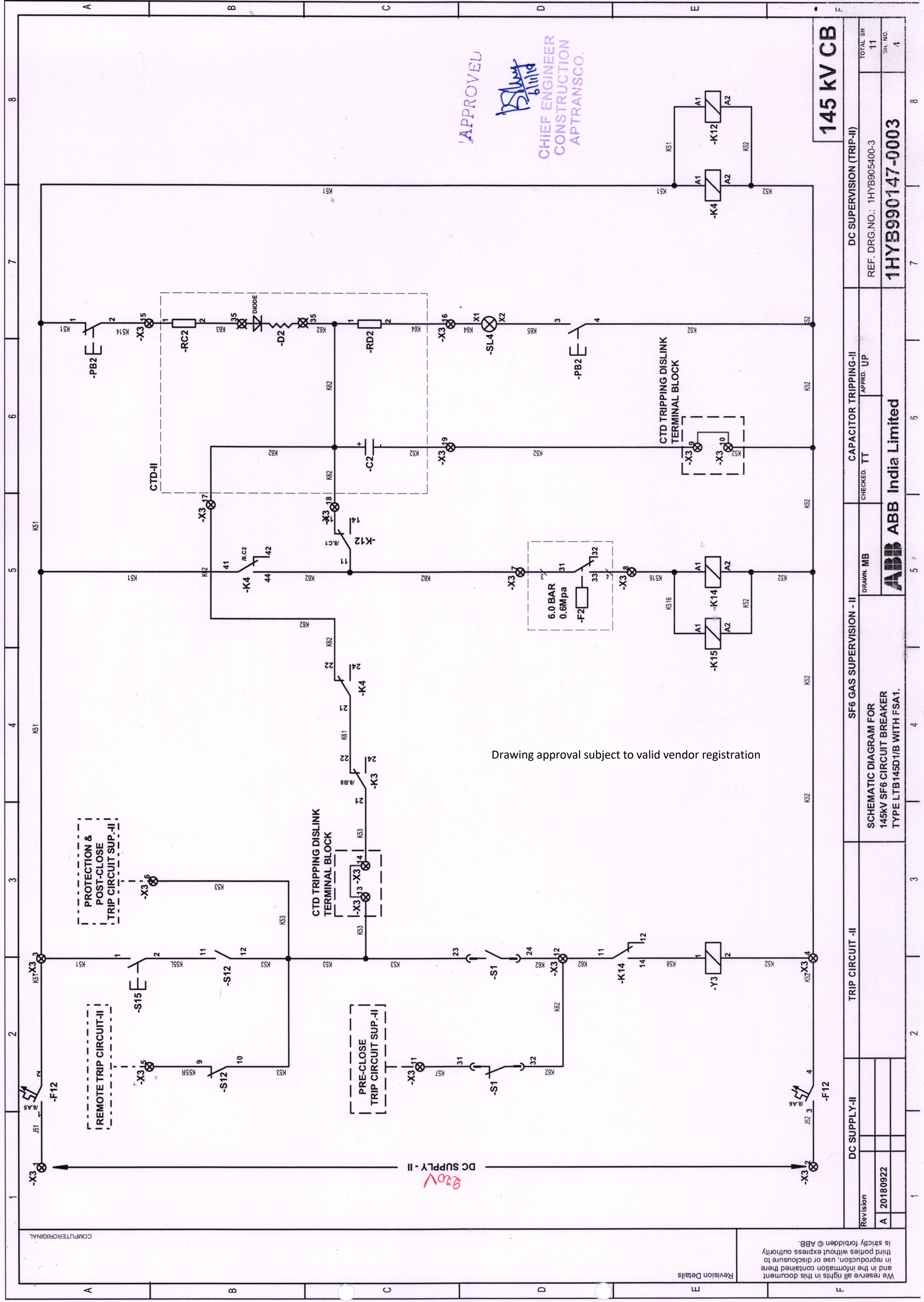
145 kV CB

Revision		DC SUPPLY		TRIP CIRCUIT - I		SF6 GAS SUPERVISION - I		CAPACITOR TRIPPING - I		DC SUPERVISION (TRIP-I)	
A 20180922								CHECKED: TT		REF. DRG. NO.: 1HYB905400-3	
								DRAWN: MB		TOTAL SH: 11	
								APPRD: UP		SH. NO.: 3	
								ABB India Limited		1HYB990147-0003	
										SCHEMATIC DIAGRAM FOR 145KV SF6 CIRCUIT BREAKER TYPE LTB145D1/B WITH FSA1.	

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145 kV CB

Revision		DC SUPPLY - II		TRIP CIRCUIT - II		SF6 GAS SUPERVISION - II		CAPACITOR TRIPPING - II		DC SUPERVISION (TRIP-II)	
A	20180922								CHECKED: TT	APPRD. UP	REF. DRG.NO.: 1HYB905400-3
				DRAWN: MB				ABB India Limited			
				SCHEMATIC DIAGRAM FOR 145KV SF6 CIRCUIT BREAKER TYPE LTB145D1/B WITH FSA1.				1HYB990147-0003			
								TOTAL SH 11			
								SH. NO. 4			

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Revision Details

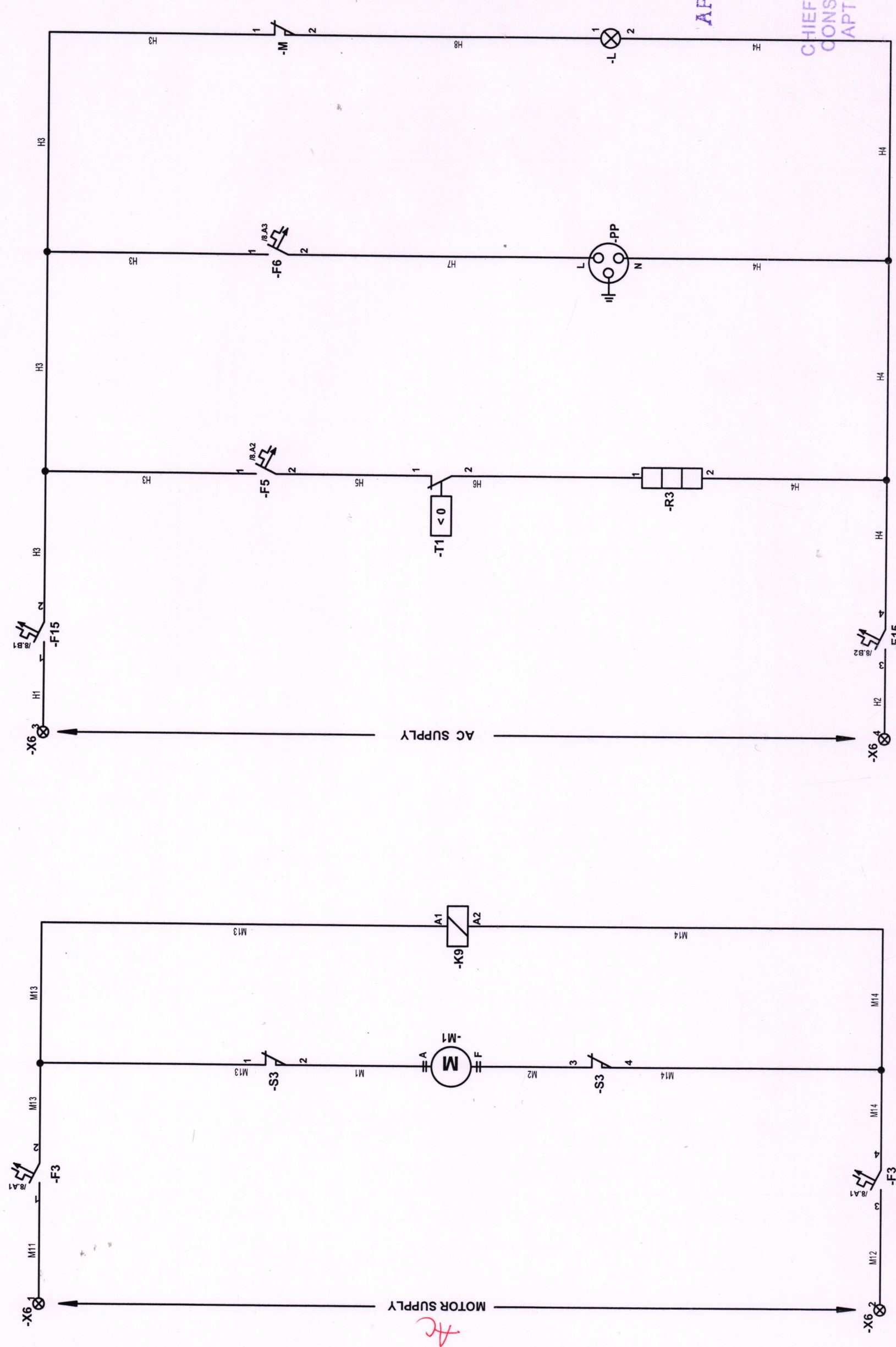
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145 KV CB



HEATER, PLUG POINT, ILLUMINATION LAMP CKT.

AC SUPERVISION (MOTOR SUPPLY)

AC CIRCUIT

SCHEMATIC DIAGRAM FOR
 145KV SF6 CIRCUIT BREAKER
 TYPE LTB145D1/B WITH FSA1.

DRAWN: MB
 CHECKED: TT
 APPRD: UP

ABB India Limited

REF. DRG. NO.: 1HYB905400-3

1HYB990147-0003

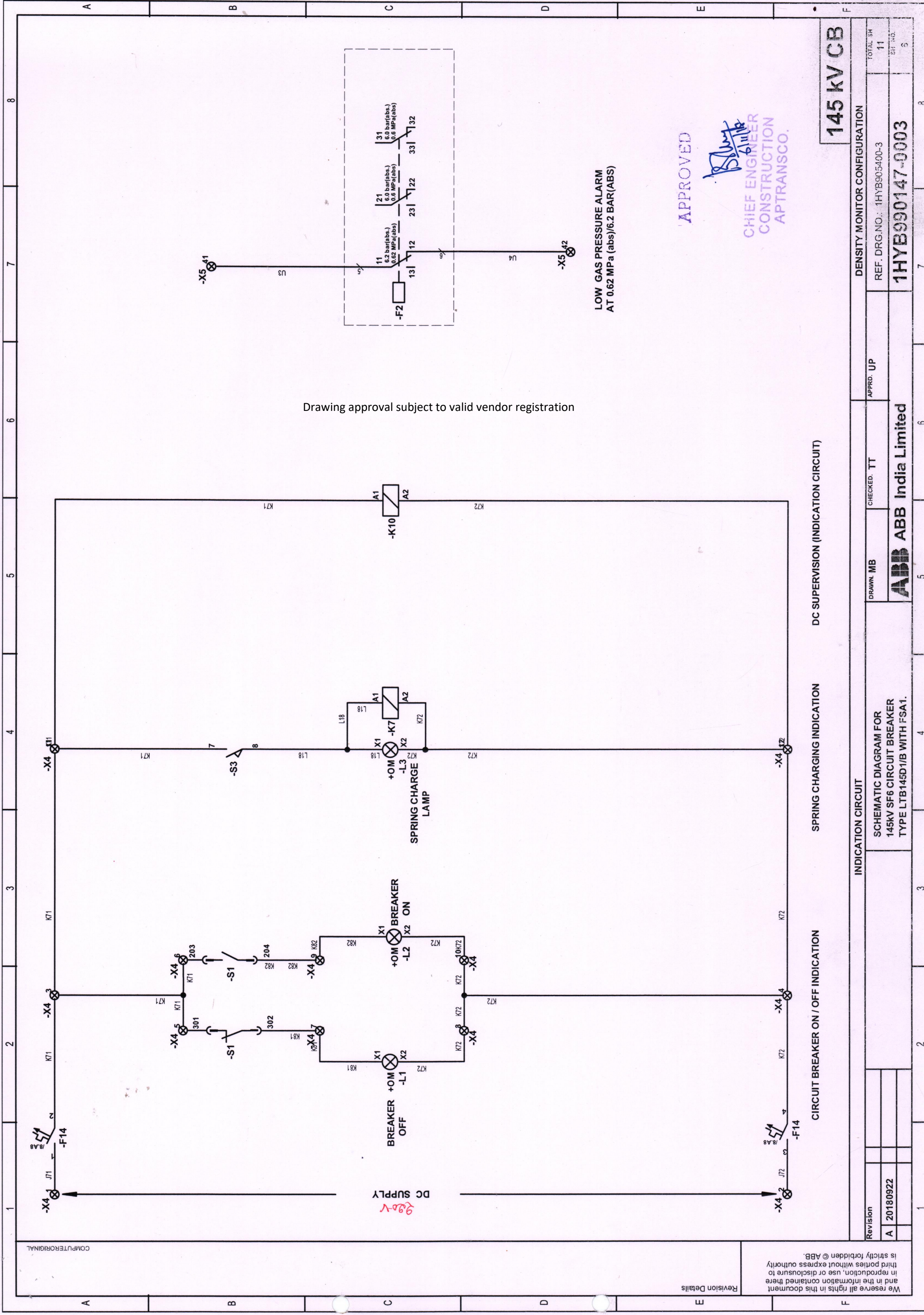
TOTAL SH 11
 SH NO 5

Revision
A 20180922

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LOW GAS PRESSURE ALARM
AT 0.62 MPa (abs)/6.2 BAR(ABS)

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145 KV CB

DC SUPERVISION (INDICATION CIRCUIT)

SPRING CHARGING INDICATION

CIRCUIT BREAKER ON / OFF INDICATION

INDICATION CIRCUIT

SCHEMATIC DIAGRAM FOR
145KV SF6 CIRCUIT BREAKER
TYPE LTB145D1/B WITH FSA1.

DENSITY MONITOR CONFIGURATION

REF. DRG.NO.: 1HYB905400-3

1HYB990147-0003

TOTAL SH 11
SH NO. 3

DRAWN: MB

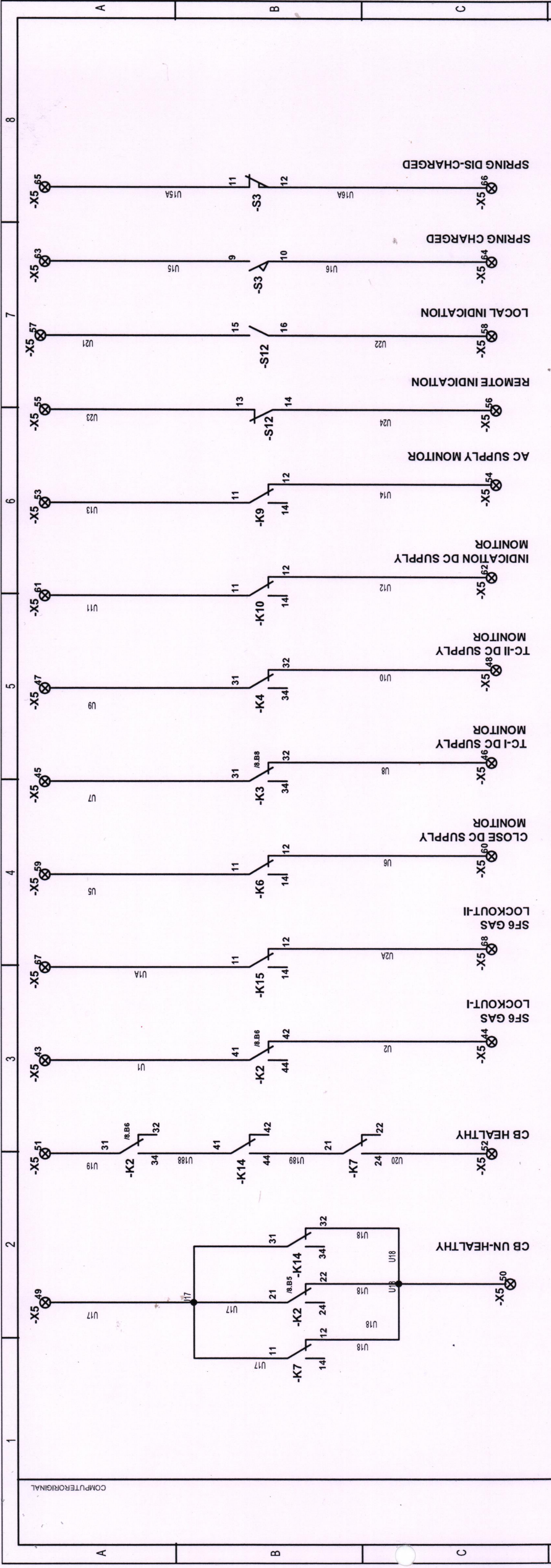
CHECKED: TT
APPRD. UP
ABB ABB India Limited

Revision
A 20180922

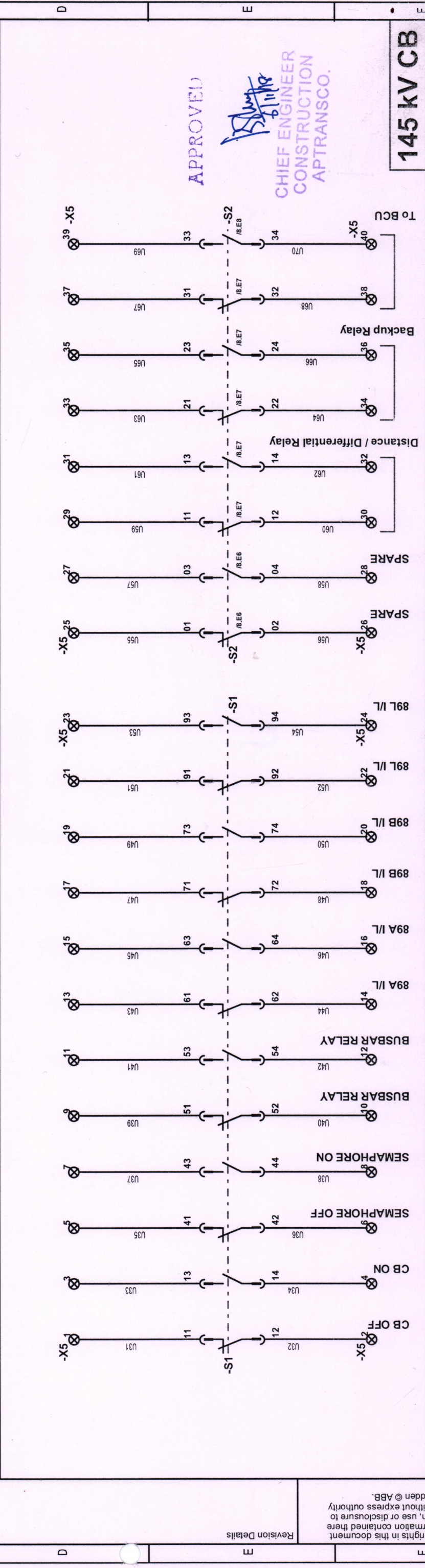
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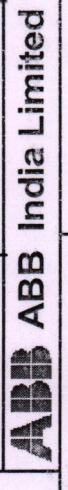
SPARE CONTACTS

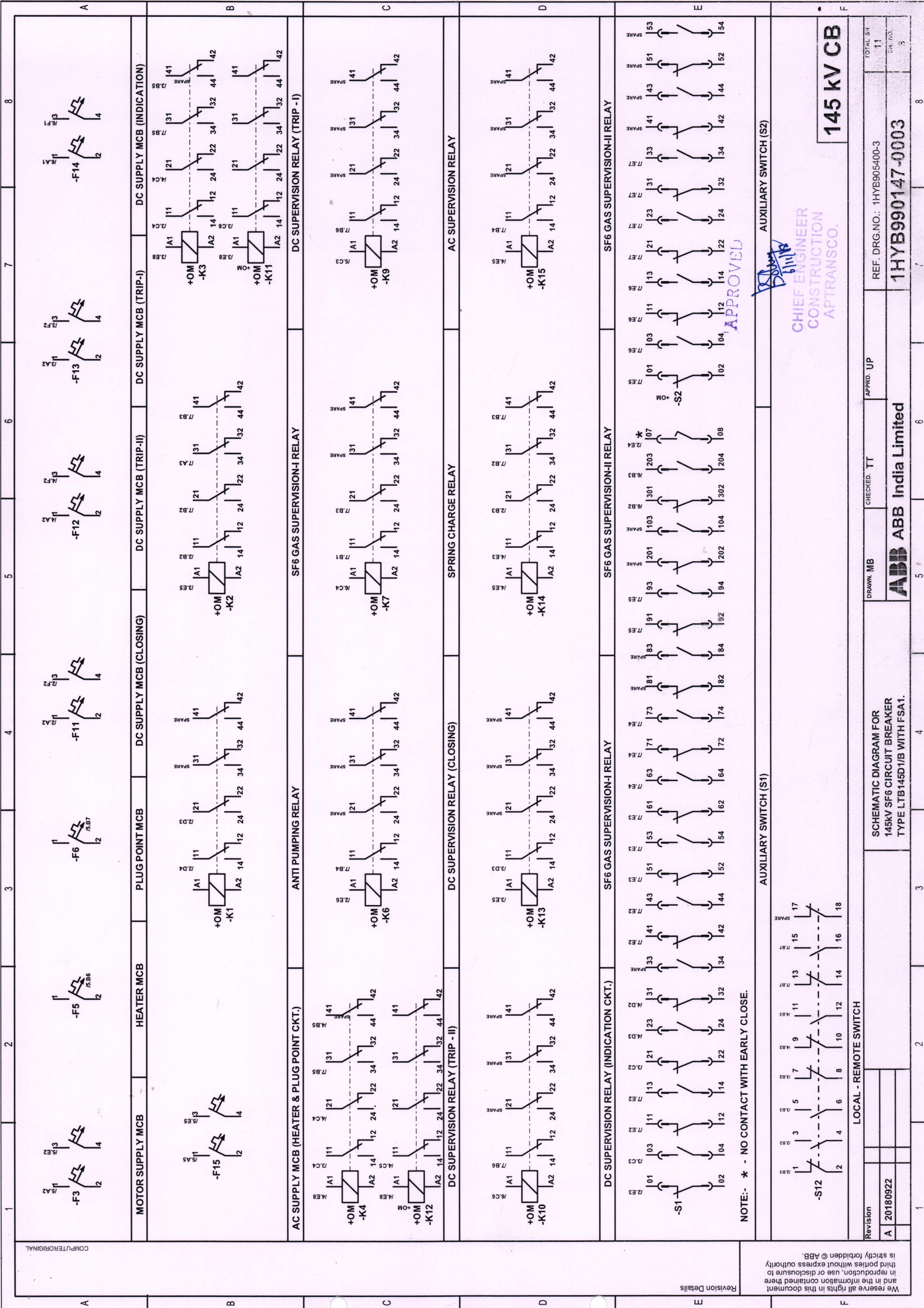


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 Construction
 APTRANSCO.

145 kV CB

Revision		DRAWN: MB		CHECKED: TT		APPROD: UP		REF. DRG. NO.: 1HYB905400-3		TOTAL SH 11	
A 20180922								1HYB990147-0003		SH. NO. 7	
SPARE CONTACT AUXILIARY SWITCH (6 NC + 6 NO) + (4 NC + 4 NO) = TOTAL SPARE CONTACTS (10 NC + 10 NO)											
SCHEMATIC DIAGRAM FOR 145KV SF6 CIRCUIT BREAKER TYPE LTB145D1/B WITH FSA1.											
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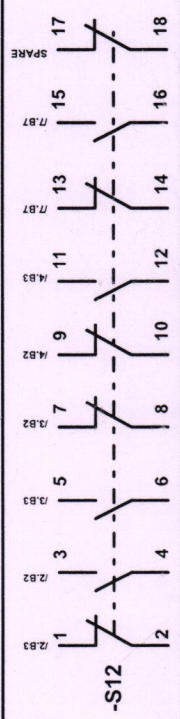


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Revision Details

Revision	
A	20180922

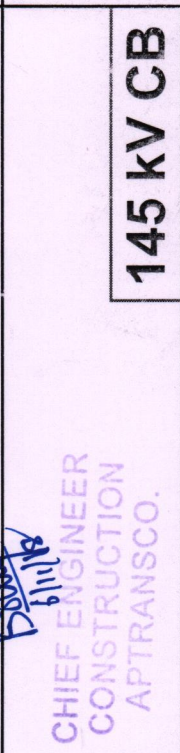
LOCAL - REMOTE SWITCH



AUXILIARY SWITCH (S1)

NOTE:- * - NO CONTACT WITH EARLY CLOSE.

AUXILIARY SWITCH (S2)



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145 kV CB

SCHEMATIC DIAGRAM FOR
 145kV SF6 CIRCUIT BREAKER
 TYPE LTB145D1/B WITH FSA1.

DRAWN: MB
 CHECKED: TT
 APPROD: UP
ABB ABB India Limited

REF. DRG.NO.: 1HYB905400-3
 1HYB990147-0003

TOTAL SH 11
 SHEET NO. 3

Bill of Material

SL.	ITEM DESIGNATION	DESCRIPTION	MAKE	RATING
1	+DM-F2	SF6 GAS DENSITY MONITOR	SANGHAI ROYE ELECTRIC/TRAFAG	10A, UP TO 250VDC
2	+OM-CTD-I	CAPACITOR TRIPPING DEVICE-I	----	----
3	+OM-CTD-II	CAPACITOR TRIPPING DEVICE-II	----	----
4	+OM-F3	2 POLE MCB-MOTOR	ABB/SIEMENS	6A, 220 V DC
5	+OM-F5	1 POLE MCB-HEATER	ABB/SIEMENS	6 A, 110-250 VAC
6	+OM-F6	1 POLE MCB-PLUG POINT	ABB/SIEMENS	6 A, 110-250 VAC
7	+OM-F11	2 POLE MCB-DC SUPPLY (CLOSING CKT.)	ABB/SIEMENS	10A, 220 VDC
8	+OM-F12	2 POLE MCB-DC SUPPLY (TRIP-II CKT.)	ABB/SIEMENS	10A, 220 VDC
9	+OM-F13	2 POLE MCB-DC SUPPLY (TRIP-I CKT.)	ABB/SIEMENS	10A, 220 VDC
10	+OM-F14	2 POLE MCB-DC SUPPLY (INDICATION CKT.)	ABB/SIEMENS	6A, 220 VDC
11	+OM-F15	2 POLE MCB-DC SUPPLY (AC CIRCUIT-HEATER & PP)	ABB/SIEMENS	6 A, 110-250 V AC
12	+OM-K1	ANTI-PUMPING RELAY	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
13	+OM-K2	GAS SUPERVISION-I RELAY	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
14	+OM-K3	DC SUPERVISION RELAY (TRIP-I)	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
15	+OM-K4	DC SUPERVISION RELAY (TRIP-II)	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
16	+OM-K6	DC SUPERVISION RELAY (CLOSING)	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
17	+OM-K7	SPRING CHARGING INDI. RELAY	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
18	+OM-K9	AC FAILURE RELAY (MOTOR CKT.)	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 230VAC
19	+OM-K10	DC SUPERVISION RELAY (INDICATION)	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
20	+OM-K11	DC SUPERVISION RELAY (TRIP-I)	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
21	+OM-K12	DC SUPERVISION RELAY (TRIP-II)	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
22	+OM-K13	GAS SUPERVISION-I RELAY	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
23	+OM-K14	GAS SUPERVISION-II RELAY	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
24	+OM-K15	GAS SUPERVISION-III RELAY	ABB/C&S/SIEMENS/SCHNIEDER	4C/O, 220VDC
25	+OM-L	ILLUMINATING LAMP	BAJAJ/PHILIPS/CGL/GELECO	240V AC, 5W / 11W
26	+OM-L1	SIGNAL LAMP LED GREEN - BREAKER OFF	ABB/TEKNIC/SIEMENS	220 V DC
27	+OM-L2	SIGNAL LAMP LED RED - BREAKER ON	ABB/TEKNIC/SIEMENS	220 V DC
28	+OM-L3	SIGNAL LAMP LED BLUE - SPRING CHARGE INDICATION	ABB/TEKNIC/SIEMENS	220 V DC
29	+OM-M	DOOR LIMIT SWITCH (SHROUDED)	KAYCEE/BOHMEN/ELMEX	5A, 250VAC
30	+OM-M1	SPRING CHARGING MOTOR	AGNI / SAHAT	220V, 735W, TYPE: UNIVERSAL
31	+OM-PB1	PUSH BUTTON	ABB/TEKNIC/SIEMENS	220 V DC
32	+OM-PB2	PUSH BUTTON	ABB/TEKNIC/SIEMENS	220 V DC
33	+OM-PP	PLUG POINT	CGL(SCHNEIDER) OR EQUI.	10 A, 240 V AC
34	+OM-R3	HEATER	KIYOSH/RVM OR EQUI.	240 V AC, 50 W
35	+OM-S1	AUXILIARY SWITCH-I	ELMEX/SHIRKE	220V-2A
36	+OM-S2	AUXILIARY SWITCH-II	ELMEX/SHIRKE	220V-2A
37	+OM-S3	MOTOR LIMIT SWITCH	ELMEX / SALZER	10A, 250VDC
38	+OM-S12	LOCAL REMOTE SELECTOR SW	SALZER/ SHIRKE	12A, UPTO 220V
39	+OM-S13	PUSH BUTTON RED	ABB/TEKNIC/SIEMENS	220 V DC

145 KV CB

Revision	APPARATUS LIST FOR 145KV SF6 CIRCUIT BREAKER TYPE LTB145D1/B WITH FSA1.	DRAWN: MB	CHECKED: UP	APPROD: UP	REF. 1HYB990147-3	TOTAL SH
A 20180922					1HYB990147-0003	11
						Sr. NO
						10

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Revision Details

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Bill of Material

SL.	ITEM DESIGNATION	DESCRIPTION	MAKE	RATING
40	+OM-S14	PUSH BUTTON GREEN	ABB/TEKNIC/SIEMENS	220 V DC
41	+OM-S15	PUSH BUTTON GREEN	ABB/TEKNIC/SIEMENS	220 V DC
42	+OM-SL3	LED LAMP WHITE (CTD-I)	ABB/TEKNIC/SIEMENS	220 V DC
43	+OM-SL4	LED LAMP WHITE (CTD-II)	ABB/TEKNIC/SIEMENS	220 V DC
44	+OM-T1	THERMOSTAT	APT CONTROLS	0-60 DEGREE CENTIGRADE
45	+OM-X1	TERMINAL BLOCK	CONNECTWELL	41A,1000V,6 SQ MM/1.2Nm ,TYPE-STH4
46	+OM-X2	TERMINAL BLOCK	CONNECTWELL	41A,1000V,6 SQ MM/1.2Nm ,TYPE-STH4
47	+OM-X3	TERMINAL BLOCK	CONNECTWELL	41A,1000V,6 SQ MM/1.2Nm ,TYPE-STH4
48	+OM-X4	TERMINAL BLOCK	CONNECTWELL	41A,1000V,6 SQ MM/1.2Nm ,TYPE-STH4
49	+OM-X5	TERMINAL BLOCK	CONNECTWELL	41A,1000V,6 SQ MM/1.2Nm ,TYPE-STH4
50	+OM-X6	TERMINAL BLOCK	CONNECTWELL	41A,1000V,6 SQ MM/1.2Nm ,TYPE-STH4
51	+OM-Y1	CLOSE COIL	ABB / SALZER / ECS	500W
52	+OM-Y2	TRIP-I COIL	ABB / SALZER / ECS	500W
53	+OM-Y3	TRIP-II COIL	ABB / SALZER / ECS	500W

Revision Details

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145 kV CB

Revision
 A 20180922

APPARATUS LIST FOR
 145KV SF6 CIRCUIT BREAKER
 TYPE LTB145D1/B WITH FSA1.

DRAWN: MB

CHECKED: UP

APPRD: UP

REF: 1HYB990147-3

ABB ABB India Limited

1HYB990147-0003

TOTAL SH
 11

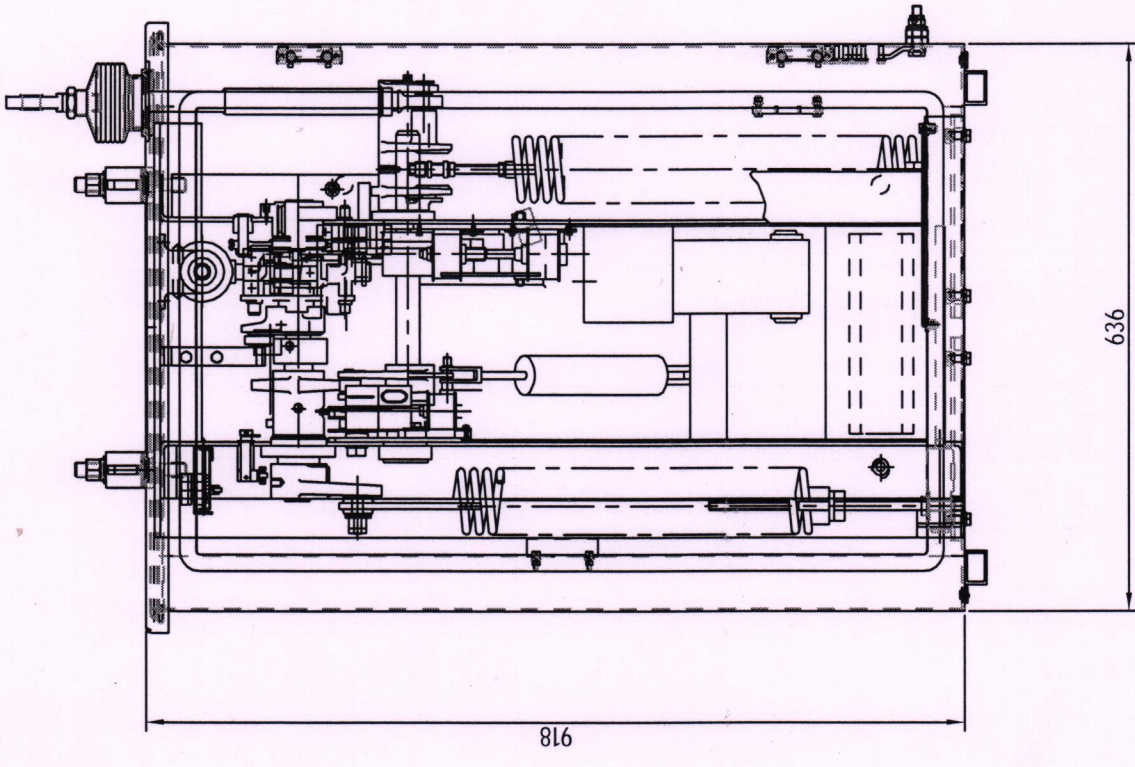
SH. NO
 11

A	B	C	D	E	F	7	8
A	B	C	D	E	F	1	2

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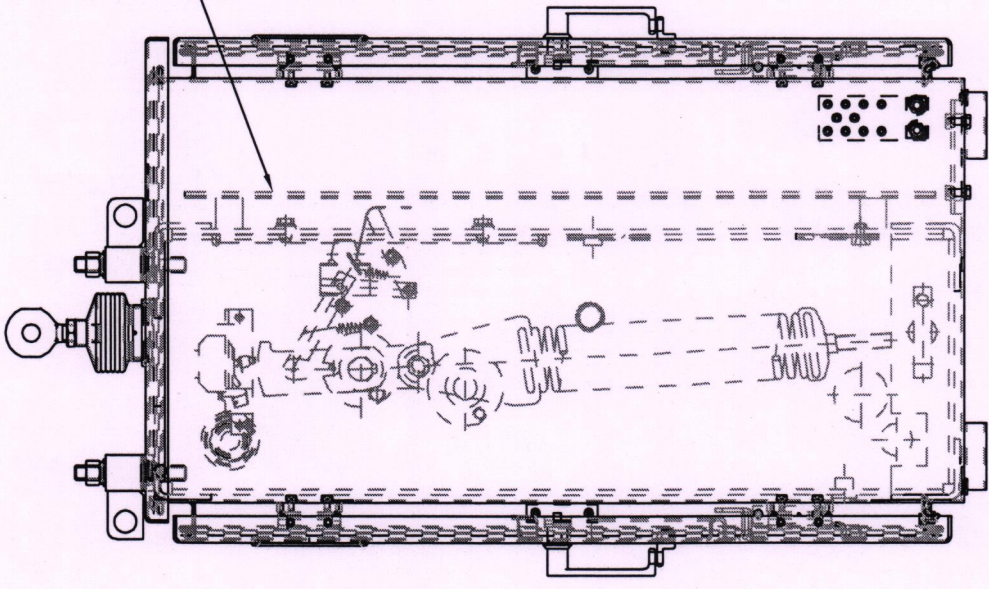
Revision Details:
 (A) NEW DRAWING PREPARED.

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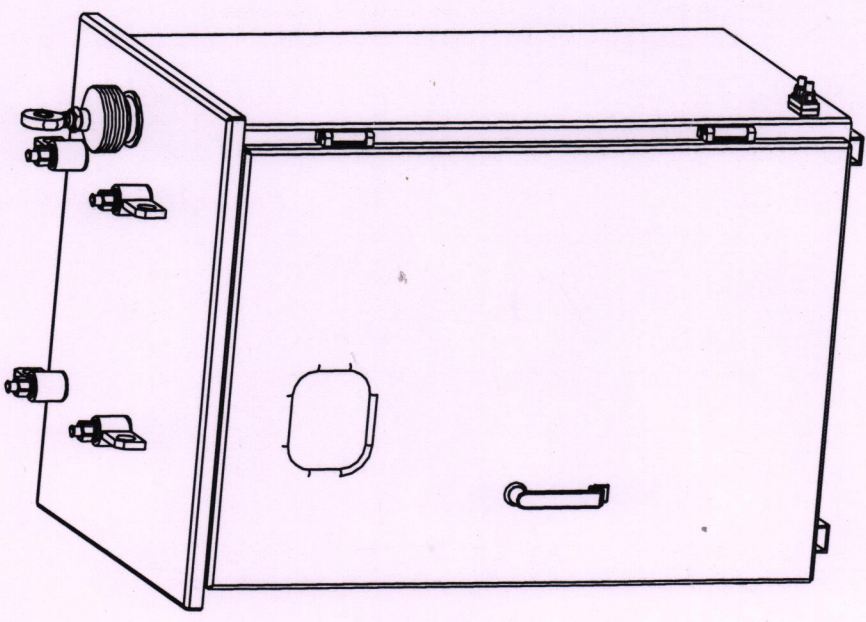


Elevation
 (without door and apparatus mounting plate)

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Side view



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 APTRANSCO.

- NOTE:-
- 1). DEGREE OF PROTECTION IP 55.
 - 2). COLOUR SHADE 631 IS: 5.
 - 3). CABINET THICKNESS: 2 mm steel sheet.
 - 4). FRONT & REAR HINGED DOOR ARRANGEMENT.

Revision	TOTAL SH.
A 20181022	1
OPERATING MECHANISM FOR 145KV SF6 CIRCUIT BREAKER TYPE LTBI45D1/B WITH FSAI	Sh. NO.
DRAWN: HJ	1HYB990147-0006
CHECKED: MB	1
APPROD. UP	8
ABB ABB Limited	7

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ABB MADE in ABB	
Circuit-breaker type	L1B145D1/B
Operating device type	FSA1
No. (See note 1.)	
Order	AS APPLICABLE
Voltage	145 kV
Insulation level	
lightning imp.with.voltage	650 kV
switching imp.with.voltage	- kV
power frequency with.voltage	275 kV
Frequency	50 Hz
Normal current	1600 A
Gas pressure SF6	abs (+20°C)
Max. working pressure	0.9 MPa
Filling	0.7 MPa
Signal	0.62 MPa
Blocking	0.6 MPa
Volume per pole	50 l
(l =litre, Signal = SF6 Gas low, Blocking = Lockout)	
END CUSTOMER : APTRANSCO	SCHEMATIC DRAWING NO.1HYB990147-0003
PO NUMBER : AS APPLICABLE	

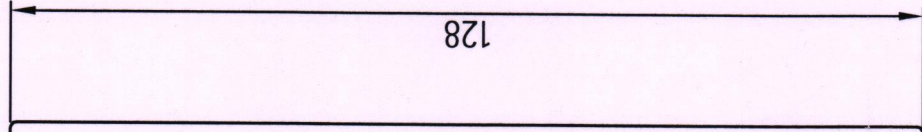
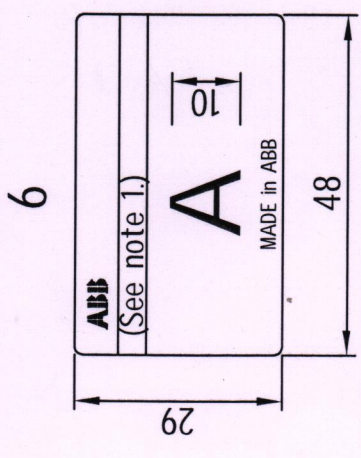


ABB MADE in ABB
Operating mechanism type FSA1
Mass 230 Kg (See note 2.)
Rated voltage 145 kV
Coils 220 VDC
Motor 240 VAC
Heater 50W

- Letter height 2 & line 0.3 thk.
- Blank text is to be engraved at ABB.
- Text to be filled with Sun-Proof black ink.
- Language English.

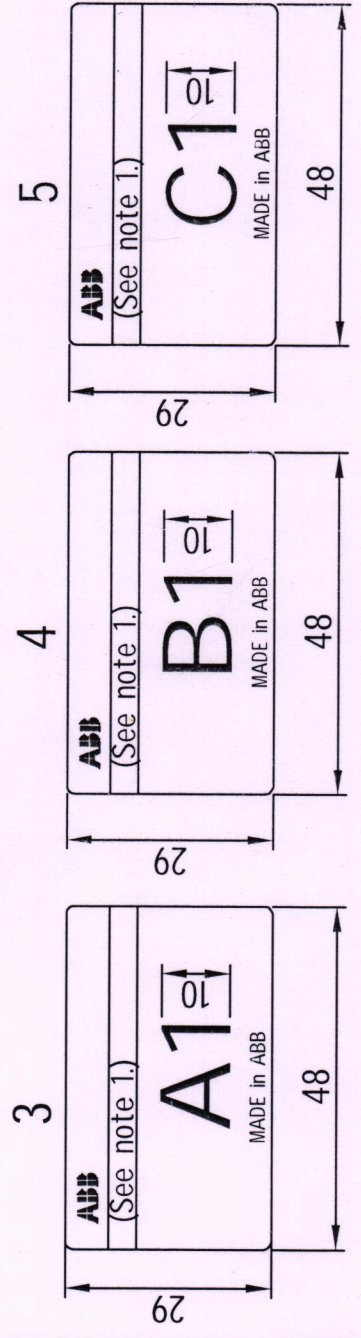


NOTE
- MOUNTED ON DRIVE

1. CIRCUIT BREAKER SERIAL NO. NOTED IN THIS SPACE.
2. OPERATING MECHANISM SERIAL NO. NOTED IN THIS SPACE.

APPROVED

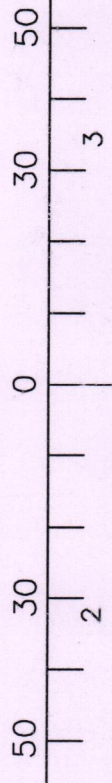
 CHIEF ENGINEER
 CONSTRUCTION
 APTRANSCO.



- MOUNTED ON RESPECTIVE POLES.

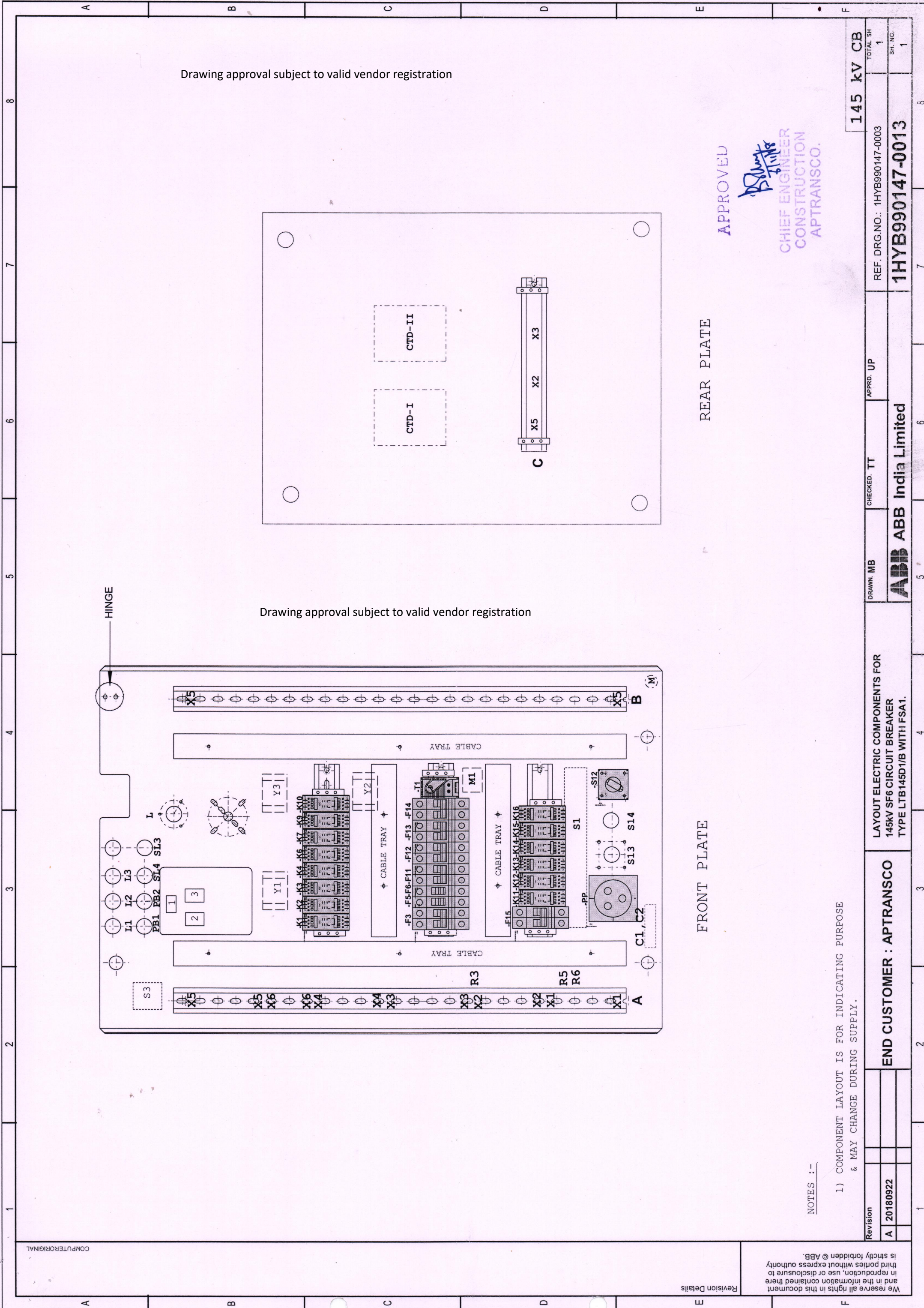
MATERIAL : S.S. 07Cr18Ni9 IS:6911-'92

Prepared: MB	Checked: TT	Approved: UP	Title
Without Sep.PL <input checked="" type="checkbox"/>	Sep.PL Same No.: <input type="checkbox"/>	Sep.PL Other No.: <input type="checkbox"/>	RATING PLATES FOR 145KV SF6 CIRCUIT BREAKER TYPE LTB145D1/B WITH FSA1
Derived from:	Supersedes:	Superseded by:	
Revision: A 20180926			
ABB India Limited			1HYB990147-0009
Scale			145 kV CB
Lang. E			
Total Sh. 1			
Sheet 1			



- MOUNTED ON RESPECTIVE POLES.

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FRONT PLATE

REAR PLATE

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Prabhat
CHIEF ENGINEER
CONSTRUCTION
APTRANSCO.

NOTES :-

- 1) COMPONENT LAYOUT IS FOR INDICATING PURPOSE & MAY CHANGE DURING SUPPLY.

Revision		CHECKED. TT	APPRD. UP	REF. DRG.NO.: 1HYB990147-0003	145 kV CB
A	20180922	DRAWN. MB		1HYB990147-0013	TOTAL SH 1
END CUSTOMER : APTRANSCO				ABB ABB India Limited	SH. NO. 1
LAYOUT ELECTRIC COMPONENTS FOR 145KV SF6 CIRCUIT BREAKER TYPE LTB145D1/B WITH FSA1.					

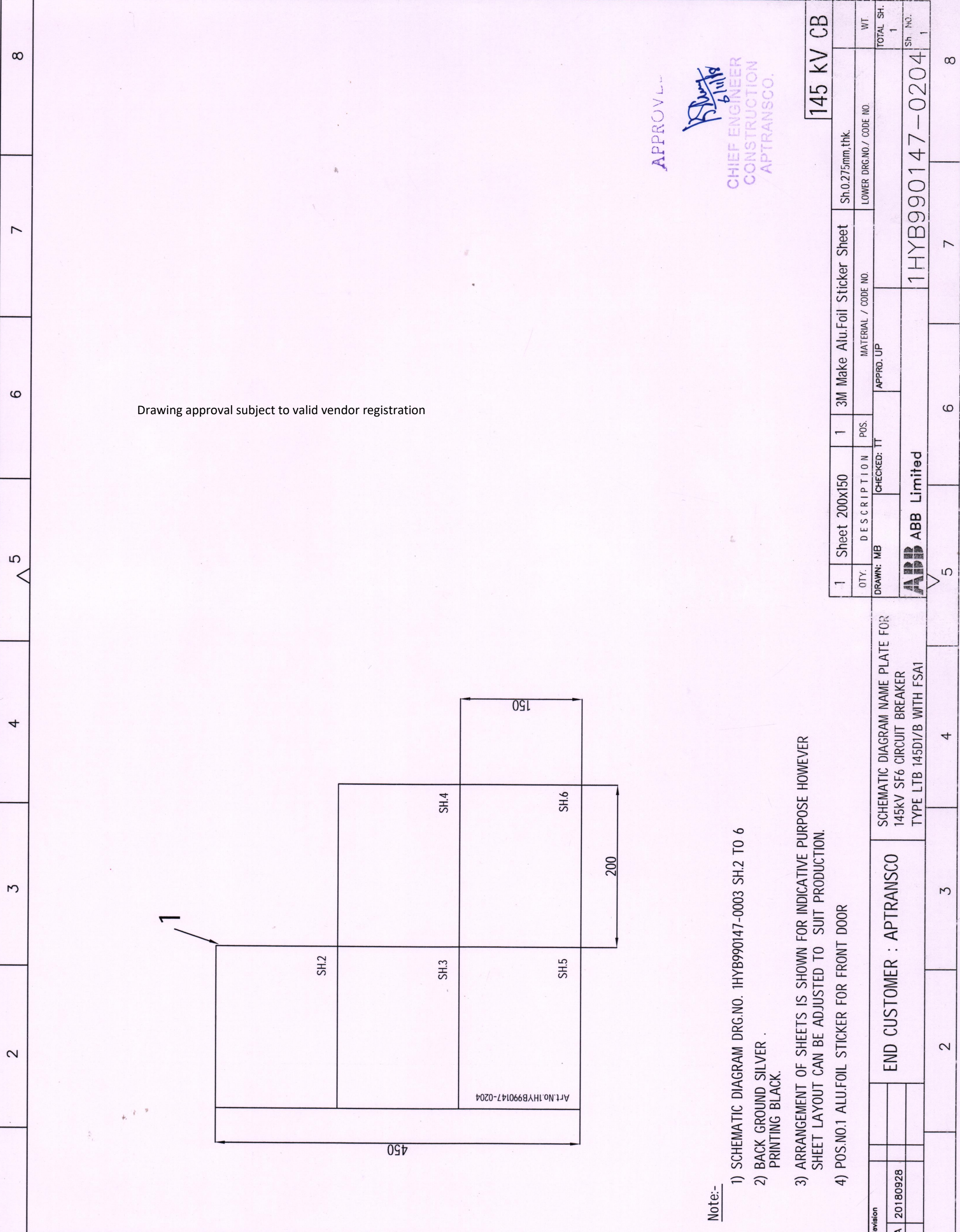
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COMPUTER ORIGINAL

A	B	C	D	E	F	7	8												
<p>COMPUTER ORIGINAL</p> <p>Revision Details:</p> <table border="1"> <tr> <th>Revision</th> <th>Description</th> </tr> <tr> <td>A</td> <td>20181105</td> </tr> </table> <p>We reserve all rights in this document and in the information contained there in. Reproduction, use or disclosure to third parties without express authority is strictly for bidden © ABB.</p>								Revision	Description	A	20181105								
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<p>LIST OF ITEMS PER STRUCTURE</p> <table border="1"> <thead> <tr> <th>ITEM NO.</th> <th>DESCRIPTION</th> <th>QTY.</th> <th>IDENTIFICATION NO.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>BREAKER FRAME - 200 X 80 X 80 X 5thk.</td> <td>2</td> <td>1HYB301128-A</td> </tr> <tr> <td>2</td> <td>FOUNDATION BOLT - M24 x 750 mm</td> <td>8</td> <td>1HYN400055R1</td> </tr> </tbody> </table>								ITEM NO.	DESCRIPTION	QTY.	IDENTIFICATION NO.	1	BREAKER FRAME - 200 X 80 X 80 X 5thk.	2	1HYB301128-A	2	FOUNDATION BOLT - M24 x 750 mm	8	1HYN400055R1
ITEM NO.	DESCRIPTION	QTY.	IDENTIFICATION NO.																
1	BREAKER FRAME - 200 X 80 X 80 X 5thk.	2	1HYB301128-A																
2	FOUNDATION BOLT - M24 x 750 mm	8	1HYN400055R1																
<p>- ALL EXPOSED STEEL PARTS SHALL BE HOT DIP GALVANISED.</p>																			
<p>Foundation plan</p>																			
<p>Foundation bolt</p> <p><i>Detail on GA Drawing shall be adopted</i></p> <p>APPROVED</p> <p><i>[Signature]</i></p> <p>CHIEF ENGINEER CONSTRUCTION APTRANSKO.</p>																			
<p>DRAWN: MB</p> <p>CHECKED: TT</p> <p>APPRD. UP</p>																			
<p>ABB India Limited</p>																			
<p>STRUCTURE ERECTION FOR 145kV SF6 CIRCUIT BREAKER TYPE LTB 145D1/B WITH FSA1</p>																			
<p>1HYB990147-0015</p>																			
<p>TOTAL SH. 1</p> <p>Sh. NO. 1</p>																			

A B C D E F



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145 kV CB

1	Sheet 200x150	1	3M Make Alu.Foil Sticker Sheet	Sh.0.275mm,thk.	WT	TOTAL SH.
QTY.	DESCRIPTION	POS.	MATERIAL / CODE NO.	LOWER DRG.NO / CODE NO.		1
DRAWN: MB	CHECKED: TT	APPRD. UP				
ABB Limited			1HYB990147-0204		Sh. No.	1

SCHMATIC DIAGRAM NAME PLATE FOR
 145KV SF6 CIRCUIT BREAKER
 TYPE LTB 145D1/B WITH FSAI

- Note:-
- 1) SCHEMATIC DIAGRAM DRG.NO. 1HYB990147-0003 SH.2 TO 6
 - 2) BACK GROUND SILVER .
PRINTING BLACK.
 - 3) ARRANGEMENT OF SHEETS IS SHOWN FOR INDICATIVE PURPOSE HOWEVER SHEET LAYOUT CAN BE ADJUSTED TO SUIT PRODUCTION.
 - 4) POS.NO.1 ALU.FOIL STICKER FOR FRONT DOOR

END CUSTOMER : APTRANSCO

Revision	Description
A	20180928

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Revision Details:

COMPUTER ORIGINAL

1 2 3 4 5 6 7 8

ABB

Guaranteed Technical Particular - 145kV SF6 Circuit Breaker

Sr. No	Description	Unit	Technical Data
A. General data			
1	Name & address of Manufacturer		ABB India Ltd, Maneja Vadodara
2	Product designation		LTB 145D1/B
2	Type & Service		Live tank, Outdoor, SF6
3	Type of Operation		Three Pole operation (Mechanically gang operated)
4	Number of Phases/Poles	Nos	Three
5	Min Temperature	°C	0
6	Max Temperature	°C	50
7	Max Altitude above MSL	Meter	1000
8	Standard to which equipment complies		IEC 62271-100
B. Ratings and Guaranteed Performance in accordance with IEC 62271-100			
1	Rated voltage	kVrms	145
2	Rated Insulation levels		
(a)	Rated Lightning Impulse Withstand Voltage		
(i)	To Earth	kVp	650
(ii)	Across the open contacts of circuit breaker	kVp	650
(b)	Rated Power Frequency Withstand Voltage		
(i)	To Earth	kVrms	275
(ii)	Across the open contacts of circuit breaker	kVrms	275
3	Rated Frequency	Hz	50
4	Rated Normal Current	Amp	3150
5	Rated Short-Circuit Breaking Current	kArms	40
6	Rated duration of short circuit current	Sec	3
7	DC Component	%	36
8	First-pole-to-clear factor		1.3/1.5
9	Rated Transient Recovery Voltage for terminal faults	kVp	As per IEC 62271-100
10	Temperature rise		Within IEC limits
11	Rated Characteristics for short line fault		
(a)	L-90	kA	36
(b)	L-75	kA	30
12	Rated making current	kAp	100
13	Out of Phase making & breaking Current	kArms	10
14	Rated Line Charging Breaking Current	Amp	50
15	Rated Cable Charging Breaking Current	Amp	160

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Guaranteed Technical Particular - 145kV SF6 Circuit Breaker

16	Capacitive Switching Class (as per IEC 62271-100)		C2
17	Rated Operating Sequence		O-0.3 sec-CO-3min-CO
18	Mechanical Endurance Class (as per specification)		M1
19	Operating times		
(a)	Opening Time (max)	ms	45
(b)	Rated break Time (max)	ms	60
(c)	Closing Time (max)	ms	75
C. Constructional features			
1	Number of Breaks per pole	Nos	One
2	Supporting Structure		Mild Steel, Hot dip galvanized (610 gm/m ²)
3	Clearance in air		
(a)	Center to center distance between phases	mm	1750
(b)	Live part to earth	mm	1220
(c)	Lower live terminal to ground clearance (including plinth)	mm	4711 (approx.)
4	Type & material of main contact		Finger, Silver Plated Copper
5	Type & material of arcing contact		Tulip, Tungsten-Copper Alloy
6	Thickness of Silver Plating of Main contacts		15 micron. (Max)
7	Rated Pressure of SF6 gas at +20°C	bar	7
8	Qty of SF6 gas to maintain the operating pressure per breaker	kg	7
9	Chemical composition of absorbent		Molecular sieve
10	Alarm Level @ 20Deg C	bar	6.2
11	Lock out @ 20Deg C	bar	6.0
12	Working SF6 gas pressure	bar	6-7 @ 20DegC
D. Insulators			
1	Color and Type of Insulator		Brown, Hollow Porcelain
2	Minimum nominal Creepage distance phase-to-earth	mm/kV	25mm/kV (3625 mm)
3	Minimum nominal Creepage distance across open breaker	mm/kV	25mm/kV (3625 mm)
4	Make		ABIL /Lillin/ Modern/ WS/equivalent.

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Guaranteed Technical Particular - 145kV SF6 Circuit Breaker

E. Operating Mechanism & Control cubicle			
1	Type of operating mechanism		Spring-Spring
3	Number of Drives per breaker		One
4	Whether fixed trip or trip-free		Trip Free
5	Material & thickness of Cubicle		CR sheet steel, 2mm thick
6	Paint Shade of cabinet		631 of IS 5
7	Degree of Protection		IP 55
8	Operating Voltage of Close Circuit	V DC	220 VDC
9	Operating range for closing coil		85% to 110% of rated voltage
10	Power at normal voltage of closing coils	W	500 W (Max)
11	Operating Voltage on Trip Circuit	V DC	220 VDC
12	Operating range for Trip coil		70% to 110% of rated voltage
13	Power at normal voltage for tripping coils		500 W (Max/Coil)
14	Spring Charging motor voltage & Power	V AC/W	240VAC, 735W
15	Type of motor		Universal type
16	Time required for spring charging	ms	15 max
17	Heater Voltage	V AC	240 V AC
18	Type of terminal block		Stud type/STH3/STH4
19	Make of terminal block		Connectwell/ Elmex/ WAGO
20	Cross section of wire	mm ²	2.5 sqmm
21	Number of spare Auxiliary contacts for purchaser use		10NO+10NC
22	Rating of Aux. Contacts at 220V DC		Continuous current – 10 A Breaking current - 2 A

APPROVED

[Handwritten Signature]
6/11/18

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