

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM)

DRAWING No. TB-3-384-510-001B

SYSTEM PARAMETERS						
DESCRIPTION	765 kV	400 kV	220 kV	132 kV	66 kV	11 kV
1) HIGHEST SYSTEM VOLTAGE	800kV (r.m.s.)	420kV (r.m.s.)	245kV (r.m.s.)	145kV (r.m.s.)	72.5kV (r.m.s.)	12kV (r.m.s.)
2) SYSTEM OPERATING VOLTAGE	765kV	400kV	220kV	132kV	66kV	11kV
3) P.F. WITHSTAND VOLTAGE	830kV (r.m.s.)	630kV (r.m.s.)	460kV (r.m.s.) dry and wet	275kV (r.m.s.) dry and wet	140kV (r.m.s.) dry and wet	28kV (r.m.s.) dry and wet
4) LIGHTING IMPULSE WITHSTAND VOLTAGE	2100 kVP	1550 kVP	1050 kVP	650 kVP	325 kVP	75 kVP
5) SWITCHING IMPULSE WITHSTAND VOLTAGE	1550 kVP	1050 kVP	---	---	---	---
6) SYSTEM FAULT LEVEL	50KA FOR 1 Sec.	63KA FOR 1 Sec.	40KA FOR 1 Sec.	31.5KA FOR 1 Sec.	31.5KA FOR 1 Sec.	25KA FOR 1 Sec.
7) CREEPAGE	25MM/KV	25MM/KV	25MM/KV	25MM/KV	25MM/KV	25MM/KV
8) SYSTEM EARTHING	EFFECTIVELY	EFFECTIVELY	EFFECTIVELY	EFFECTIVELY	EFFECTIVELY	EFFECTIVELY

800kV, 3000A, CT

Core No.	Current Ratio	Accuracy Class	Output Burden VA	Min kPV (V)	Max RCT in Ohms	Max Im at kPV (mA)	Purpose
1	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	BUS DIFF. CHECK
2	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	BUS DIFF. MAIN
3	3000-2000-500 / 1	0.2S 0.2S 0.2S	20 20 20	-	-	-	METERING
4	3000-2000-500 / 1	0.2S 0.2S 0.2S	20 20 20	-	-	-	METERING
5	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	TRANS. BACKUP/LINE BACKUP PROT.N.
6	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	LINE PROT.N./LBB PROT.N.

All protection class shall be accuracy class TPS as per IEC 60044. Metering cores shall be accuracy class 0.2S as per IEC: 60044-1

400kV, 3000A, CT

Core No.	Current Ratio	Accuracy Class	Output Burden VA	Min kPV (V)	Max RCT in Ohms	Max Im at kPV (mA)	Purpose
1	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	BUS DIFF. CHECK
2	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	BUS DIFF. MAIN
3	3000-2000-500 / 1	0.2S 0.2S 0.2S	20 20 20	-	-	-	METERING
4	3000-2000-500 / 1	0.2S 0.2S 0.2S	20 20 20	-	-	-	METERING
5	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	TRANS. BACKUP/LINE BACKUP PROT.N.
6	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	TRANS. DIFF./LINE PROT.N.

All protection class shall be accuracy class TPS as per IEC 60044. Metering cores shall be accuracy class 0.2S as per IEC: 60044-1

800KV CVT:

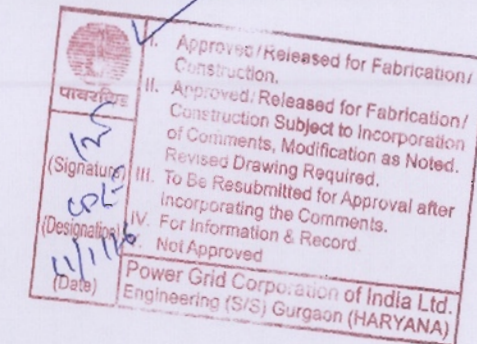
Ratio	765kV / √3	110V / √3	110V / √3	110V / √3
Sec-I	Class - 0.5/3P, 50VA			
Sec-II	Class - 0.5/3P, 50VA			
Sec-III	Class - 0.2, 50VA Capacitance - 8800 pF (+10%, -5%)			

Rated Voltage factor: 1.2 Continuous
1.5 for 30 sec

400KV CVT:

Ratio	400kV / √3	110V / √3	110V / √3	110V / √3
Sec-I	Class - 0.5/3P, 50VA			
Sec-II	Class - 0.5/3P, 50VA			
Sec-III	Class - 0.2, 50VA Capacitance - 4400 pF (+10%, -5%)			

Rated Voltage Factor: 1.2 Continuous
1.5 for 30 Seconds



NOA NO. : CC-CS/483-WR2/SS-2803/11/G8/NOA-1&2/5507 & 5508 DT. 01.09.15	
ADDITIONAL INFORMATION W.O.No. 85003	ग्राहक/परियोजना का नाम POWER GRID CORPORATION OF INDIA LIMITED NAME OF CUSTOMER/PROJECT SUBSTATION PACKAGE-SS02 FOR CONSTRUCTION OF 765/400/220KV BANASKANTHA S/S & EXT. OF 400KV SANKHARI(GETCO) S/S UNDER GREEN ENERGY CORRIDOR ISTS PART-B(PART-1)
STATUS OF DRAWING CONTRACT	डिस्ट्रिब्यूशन परियोजना विभाग BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION
DISTRIBUTION OF PRINTS	नाम /NAME JS डिज़ाइन SK/AA स्वीकृत AS/RS
REV. DATE ALTERED JS 20.10.15 CHECKED SK/AA APPROVED AS/RS	डिप्टी TBEM DEPT. कोड 422 प्रमाणित / SCALE NTS कार्ड कोड CARD CODE
ZONE REVISED AS PER PGCIL COMMENT VIDE LETTER DATED 30 OCT 2015	शीट/TITLE SINGLE LINE DIAGRAM FOR 765/400/220KV BANASKANTHA S/S. ड्राइंग. नं./DRAWING NO. TB-3-384-510-001B पृष्ठ नं./SHEET No.07 जगला पृष्ठ/NEXT SHEET 08

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COMPUTER DRG. PATH NAME :

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

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onds

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

DRAWING No. TB-3-384-510-001B

220kV, 1600A, CT

- a) 120% Extended Rating applicable for ICT#1,#2 and Transfer Bus Bays
- b) 150% Extended Rating applicable for Bus Coupler Bay

Core No.	Current Ratio	Accuracy Class	Output Burden VA	Min kPV (V)	Max RCT in Ohms	Max Im at kPV (mA)	Purpose
1	1600-800 / 1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	BUS DIFF. CHECK
2	1600-800 / 1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	BUS DIFF. MAIN
3	1600-800 / 1	0.2S	20	-	-	-	METERING
4	1600-800 / 1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	TRANS. BACKUP/LINE BACKUP PROT.N.
5	1600-800 / 1	PS	-	1600-800	8-4	25mA on 1600/1 Tap 50mA on 800/1 Tap	TRANS. DIFF./LINE PROT.N.

Accuracy class PS as per IS:2705

220KV CVT:

Ratio	220KV / 110V / 110V / 110V
	$\sqrt{3} / \sqrt{3} / \sqrt{3} / \sqrt{3}$
Sec-I	Class - 3P, 50VA
Sec-II	Class - 3P, 50VA
Sec-III	Class - 0.2, 50VA
	Capacitance - 4400 pF (+10%, -5%)

Rated Voltage Factor: 1.2 Continuous
1.5 for 30 Seconds

72.5kV, 50A, CT

Core No.	Current Ratio	Accuracy Class	Output Burden VA	Min kPV (V)	Max RCT in Ohms	Max Im at kPV (mA)	Purpose
1	50 / 1	5P10	10	-	-	-	O/C & E/F
2	50 / 1	0.5	10	-	-	-	Metering

72.5KV VT:

Ratio	33KV / 110V / 110V / 110V
	$\sqrt{3} / \sqrt{3} / \sqrt{3} / \sqrt{3}$
Sec-I	Class - 3P, 10VA
Sec-II	Class - 0.5, 10VA

LEGENDS:-

	PRESENT SCOPE
	FUTURE/EXISTING SCOPE

NOTES:

1. (a) ELECTRICAL CONNECTION SHALL BE MADE MANUALLY DEPENDING UPON 765kV SIDE SWITCHING OF DIFFERENT FEEDERS OF AUTOTRANSFORMER/REACTOR.
2. SUPPLY, ERECTION, TESTING & COMMISSIONING INCLUDING FORMATION OF HV, LV, NEUTRAL, TERTIARY & AUXILIARY BUSES OF 3x500MVA, (765kV / $\sqrt{3}$) / (400kV / $\sqrt{3}$) / 33kV 10 AUTO TRANSFORMERS AND LINE/BUS REACTOR ARE NOT IN BHEL SCOPE.
3. 765kV WAVE TRAP SHALL BE PROVIDED IN TWO PHASE ONLY.
4. 400kV WAVE TRAP SHALL BE PROVIDED IN ONE PHASE ONLY.
5. PART-2 EQUIPMENTS SHALL BE SUPPLIED BY BHEL AFTER ORDER RECEIVED FROM PGCIL.

Approved/Released for Fabrication/ Construction.
 II. Approved/Released for Fabrication/ Construction Subject to Incorporation of Comments, Modification as Noted. Revised Drawing Required.
 III. To Be Resubmitted for Approval after incorporating the Comments.
 IV. For Information & Record
 Not Approved

Power Grid Corporation of India Ltd.
 Engineering (S/S) Gurgaon (HARYANA)

Handwritten: cat-1

NOA NO. : CC-CS/483-WR2/SS-2803/11/G8/NOA-1&2/5507 & 5508 DT. 01.09.15		ग्राहक/परियोजना का नाम POWER GRID CORPORATION OF INDIA LIMITED	
ADDITIONAL INFORMATION W.O.No. 85003		NAME OF CUSTOMER/PROJECT SUBSTATION PACKAGE-SS02 FOR CONSTRUCTION OF 765/400/220KV BANASKANTHA S/S & EXT. OF 400KV SANKHARI(GETCO) S/S UNDER GREEN ENERGY CORRIDOR ISTS PART-B(PART-1)	
STATUS OF DRAWING CONTRACT		DISTRIBUTION OF PRINTS	
DISTRIBUTION OF PRINTS		भारत हेवी इलेक्ट्रिकल्स लिमिटेड भारतीय परियोजना विभाग BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
REV.	DATE	ALTERED	JS
	20.10.15	CHECKED	SK/AA
		APPROVED	AS/RS
ZONE	REVISED AS PER PGCIL COMMENT VIDE LETTER DATED 30 OCT 2015	डिप्ट. TBEM	कोड 422
		अनुपात / SCALE	कार्ड कोड
		NTS	CARD CODE
शीर्षक/TITLE		ड्राईंग. नं./DRAWING NO.	
SINGLE LINE DIAGRAM FOR 765/400/220KV BANASKANTHA S/S.		TB-3-384-510-001B	
पृष्ठ नं./SHEET No.08		अगला पृष्ठ/NEXT SHEET -	

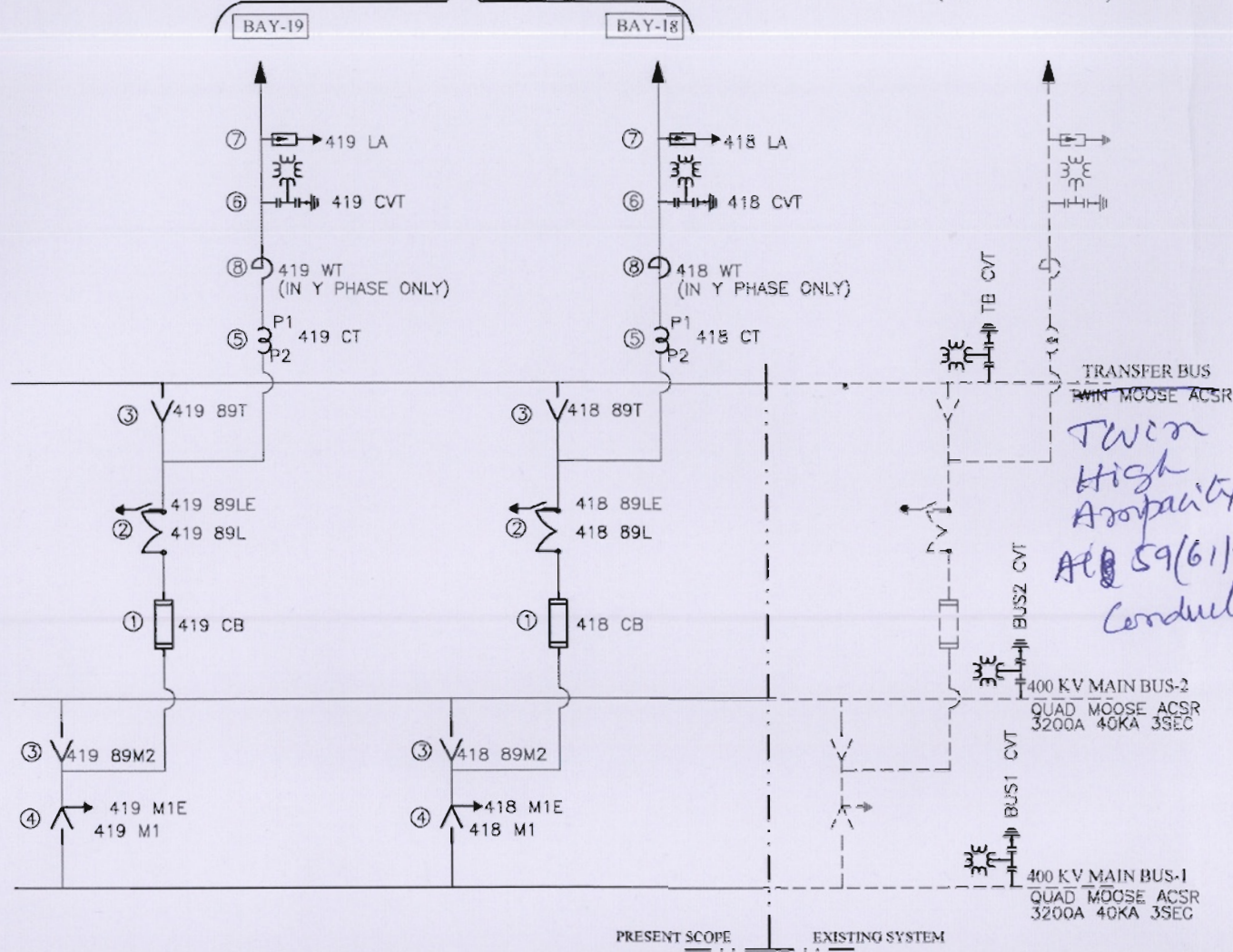
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 COMPUTER DRG. PATH NAME :

INVENTORY No.
SIGN. & DATE
REF. DRG. No.

DRAWING No. TB-3-384-510-021

BANASKATHA D/C LINE EXISTING 400 KV SYSTEM

(REFER REMARK 3.)



REMARK -

1. WAVE TRAP PHASE TO BE CONFIRMED BY CUSTOMER
2. EXISTING BUS CVT AND BUS EARTH SWITCH SIGNAL FOR THE PRESENT SCOPE TO BE MADE AVAILABLE BY CUSTOMER.
3. REFERENCE DRAWING - GETCO/E/45-130/P-002 S-1 RO

400KV CVT:

Ratio	400KV / 110V / 110V / 110V
	$\sqrt{3} / \sqrt{3} / \sqrt{3} / \sqrt{3}$
Sec-I	Class - 0.5/3P, 50VA
Sec-II	Class - 0.5/3P, 50VA
Sec-III	Class - 0.2, 50VA
	Capacitance - 4400 pF (+10%, -5%)

Rated Voltage Factor: 1.2 Continuous
1.5 for 30 Seconds

400KV, 3000A, CT

Core No.	Current Ratio	Accuracy Class	Output Burden VA	Min kPV (V)	Max RCT in Ohms	Max Im at kPV (mA)	Purpose
1	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	BUS DIFF. CHECK
2	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	BUS DIFF. MAIN
3	3000-2000-500 / 1	0.2S	20	-	-	-	METERING
4	3000-2000-500 / 1	0.2S	20	-	-	-	METERING
5	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	TRANS. BACKUP/LINE BACKUP PROT.N.
6	3000-2000-500 / 1	TPS	-	3000-2000-500	15-10-2.5	20mA on 3000/1 Tap 30mA on 2000/1 Tap 120mA on 500/1 Tap	TRANS. DIFF./LINE PROT.N.

All protection class shall be accuracy class TPS as per IEC 60044. Metering cores shall be accuracy class 0.2S as per IEC: 60044-1

BILL OF QTY. FOR 400kV MAIN EQUIPMENTS:

SL.NO	DESCRIPTION	RATING	QTY. (PART-1) (NO.)	SYMBOL	SCOPE OF SUPPLY	LEGEND
01	SF6 CIRCUIT BREAKER WITHOUT CR, WITHOUT CSD (3-PH)	3150A	2		BHEL	52
02	ISOLATOR WITH ONE E/SW (3 PH) HORIZONTAL CENTRE BREAK	2000A	2		BHEL	89/89E
03	ISOLATOR WITHOUT E/SW (3 PH) PANTOGRAPH TYPE	2000A	4		BHEL	89
04	ISOLATOR WITH ONE E/SW (3 PH) PANTOGRAPH TYPE	2000A	2		BHEL	89/89E
05	CURRENT TRANSFORMER (1 PH) WITH 120% EXTENDED CURRENT RATING	3000A	6		BHEL	CT
06	CVT (1 PH)	4400pF	6		BHEL	CVT
07	SURGE ARRESTER (1 PH)	336 kV	6		BHEL	LA
08	WAVE TRAP (1 PH) PEDESTAL TYPE	0.5mH, 2000A	2		BHEL	WT

SYSTEM PARAMETERS	
DESCRIPTION	400 kV
1) HIGHEST SYSTEM VOLTAGE	420kV (r.m.s.)
2) SYSTEM OPERATING VOLTAGE	400kV
3) P.F. WITHSTAND VOLTAGE	630kV (r.m.s.)
4) LIGHTING IMPULSE WITHSTAND VOLTAGE	1550 kVP
5) SWITCHING IMPULSE WITHSTAND VOLTAGE	1050 kVP
6) SYSTEM FAULT LEVEL	40 KA FOR 3 Sec.
7) CREEPAGE	25MM/KV
8) SYSTEM EARTHING	EFFECTIVELY

वेदिका
 1. फेरीकरण / निर्माण / हेतु अनुमोदित / जारी।
 2. फेरीकरण / निर्माण / हेतु अनुमोदित / जारी।
 3. फेरीकरण / निर्माण / हेतु अनुमोदित / जारी।
 4. फेरीकरण / निर्माण / हेतु अनुमोदित / जारी।
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 8. फेरीकरण / निर्माण / हेतु अनुमोदित / जारी।
 9. फेरीकरण / निर्माण / हेतु अनुमोदित / जारी।
 10. फेरीकरण / निर्माण / हेतु अनुमोदित / जारी।

NOA NO. : CC-CS/483-WR2/SS-2803/11/GB/NOA-1&2/5507 & 5508 DT. 01.09.15

POWER GRID CORPORATION OF INDIA LIMITED

NAME OF CUSTOMER/PROJECT: SUBSTATION PACKAGE-SS02 FOR CONSTRUCTION OF 765/400/220KV BANASKANTHA S/S & EXT. OF 400KV SANKHARI(GETCO) S/S UNDER GREEN ENERGY CORRIDOR ISTS PART-B(PART-1)

W.O.No. 85003

STATUS OF DRAWING: CONTRACT

DISTRIBUTION OF PRINTS:

REV. DATE: 20.10.15

ALTERED: JS

CHECKED: SK/AA

APPROVED: AS/RS

विभाग: TBEM

कोड: 422

उत्पाद / SCALE: NTS

मॉड कोड: CARD CODE

REVISOR: AS/RS

ड्राईंग क्र./DRAWING NO. TB-384-510-021

पृष्ठ क्र./SHEET No. 01

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COMPUTER DRG. PATH NAME :

REF. DRG. No.

SIGN. & DATE

INVENTORY No.