

## LIST OF MANDATORY SPARES/ MAINTENANCE EQUIP/ ELECTRICAL TEST LAB EQUIP. FOR NORTH KARANPURA

Sl.No.	Item Description	Quantity	Remarks
<b>A LIST OF MANDATORY SPARES</b>			
<b>I</b>	<b>400kV CIRCUIT BREAKERS</b>		
1	Relays, power contactors, switch-fuses for electrical control circuit (consisting of one no. each of all types and ratings)	1 set	
2	Set of gaskets, rings & seals	1 set	
3	Molecular filter for Circuit breaker	1 set	
4	Tripping and closing coil (each type)	6 nos.	
5	Density monitoring system for ckt. Bkr	2 sets.	
6	Set of spares for pneumatic/ Spring/ hydraulic operated mechanism (as applicable) as per detail below	2 sets	
	<b>Spare for pneumatic operated mechanism</b>		
	a. Motor for compressor- 1no.		
	b. Pressure switch and valve-1no. of each type		
	<b>Spare for spring operated mechanism</b>		
	a. Motor with gears-1no.		
	b. Limit switch- 1no. of each type		
	<b>Spare for hydraulic operated mechanism</b>		
	a. Motor with gears-1no.		
	b. Limit switch- 1no. of each type		
7	Fixed and moving arcing contact	1 Set each of 3150A & 2000A	
8	Terminal connector (of each type)	3 nos.	
9	One Complete Pole including operating mechanism but excluding support structure and terminal connectors.	1 no.-3150A 1 no.-2000A	
10	SF6 Gas Filling valve	1No.	
<b>II</b>	<b>220kV CIRCUIT BREAKERS</b>		
1	Relays, power contactors, switch-fuses for electrical control circuit (consisting of one no. each of all types and ratings)	1 set	
2	Set of gaskets, rings & seals	1 set	
3	Molecular filter for Circuit breaker	1 set	
4	Tripping and closing coil (each type)	6 nos.	
5	Density monitoring system for ckt. Bkr	2 sets.	
6	Set of spares for pneumatic/ Spring/ hydraulic operated mechanism (as applicable) as per detail below	2 sets	
	<b>Spare for pneumatic operated mechanism</b>		
	a. Motor for compressor- 1no.		
	b. Pressure switch and valve-1no. of each type		
	<b>Spare for spring operated mechanism</b>		
	a. Motor with gears-1no.		
	b. Limit switch- 1no. of each type		
	<b>Spare for hydraulic operated mechanism</b>		
	a. Motor with gears-1no.		
	b. Limit switch- 1no. of each type		
7	Fixed and moving arcing contact	1 Set each of 1600A & 2500A	
8	Terminal connector (of each type)	2 nos.	
9	One Complete Pole including operating mechanism but excluding support structure and terminal connectors.	1 no.-1600A 1 no.-2500A	
10	SF6 Gas Filling valve	1No.	
<b>III</b>	<b>400kV ISOLATORS</b>		
1	One complete pole of HCB isolator with 2 E/S along with operating mechanisms, etc. without support structure	1 no.-3150A 1 no.-2000A	
2	Copper contact fingers for female contacts	6 nos.	
3	Relay, power contactors, switch fuses for electrical control circuit (one no. of each type and rating)	1 set	
4	Limit switch & aux. switch	6 nos.	
5	Terminal connectors	1 no. of each type	
6	Rotary Bearing for Isolator	3Nos.	
<b>IV</b>	<b>400kV ISOLATORS</b>		
1	One complete pole of HCB isolator with 2 E/S along with operating mechanisms, etc. without support structure	1 no.-2500A 1 no.-1600A	
2	Copper contact fingers for female contacts	6 nos.	
3	Relay, power contactors, switch fuses for electrical control circuit (one no. of each type and rating)	1 set	
4	Limit switch & aux. switch	6 nos.	
5	Terminal connectors	1 no. of each type	
6	Rotary Bearing for Isolator	3Nos.	
<b>V</b>	<b>400kV CURRENT TRANSFORMER</b>		
1	CURRENT TRANSFORMER complete in all respects including terminal connectors etc.	1 no. 2000A - 120% extended rating  1 no. 3000A - 120% extended rating	
<b>VI</b>	<b>220kV CURRENT TRANSFORMER</b>		

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SI.No.	Item Description	Quantity	Remarks
1	CURRENT TRANSFORMER complete in all respects including terminal connectors etc.	1 no. 1600A - 120% extended rating 1 no. 3000A - 120% extended rating	
VII	400kV CAPACITOR VOLTAGE TRANSFORMER		
1	CAPACITOR VOLTAGE TRANSFORMER complete in all respects including terminal connectors etc.	1no.* (4400pF) 1no.* (8800pF)	*' - If only one pF rating CVT is supplied as main item then 2nos. of the same shall be supplied as spare
VIII	220kV CAPACITOR VOLTAGE TRANSFORMER		
1	CAPACITOR VOLTAGE TRANSFORMER complete in all respects including terminal connectors etc.	NIL	
IX	336kV SURGE ARRESTER		
1	SURGE ARRESTER complete in all respects with surge counter, etc.	2 nos.	
XI	216kV SURGE ARRESTER		
1	SURGE ARRESTER complete in all respects with surge counter, etc.	2 nos.	
Notes:	1. Set means for complete replacement of one circuit breaker and isolator (three phase). 2. For CT, CVT and Surge Arrestor, number (no.) means for complete replacement of on pole/phase of the equipment.		
XII	MANDATORY SPARES FOR 400/220 KV SWITCHYARD HARDWARE		
1	10% of each type of clamps, connectors and spacers	1Lot	
2	03 nos. of each type of insulator string and hardware	1Lot	
XIII	SAS INCLUDING GRPs		
1	Bay Control unit (complete with all components)	2 Nos.	
2	Numerical Relays comprising various bay protection units, Bus Bar protection relays and Islanding relays	1 No. of each type	
3	Numerical Relays comprising GRP	1 No. of each type	
4	PMU (complete with all necessary accessories, cables etc. as per specification)	1 Set	
5	Cards/modules of Generator Disturbance Recorder, Line DR (if stand-alone)	1 No. of each type	
6	Energy Meter	1 no. of each type	
7	Operator work station (OWS) along with software, monitor, mouse, keyboard, printer etc.	1 No.	
8	Complete Network Controller / Server along with software	1 No.	
9	Complete Programming station along with software, monitor etc.	1 No.	
10	LAN switches (If included in main package)	1 No. of each type	
11	Media cleaning solution	2 bottles	
12	Fuses	100% of each type	
13	Terminal Blocks	5 nos. of each type, make, model & rating	
14	Interface cables containing standard length of each type of cable and its connector for each type of peripheral	2 Sets	
15	MCBs	50% of each type, make and model used	
16	Relays other than numerical relays	10% of each type of	
17	Gateways	1 no. of each type	
18	Modem (if applicable)	1 no. of each type	
19	LIU of OFC including necessary connectors	1 no. of each type	
20	Transducers	1 no. of each type	
21	Auxiliary CT/PT	1 no. of each type	
22	Lamps used in LVS	50% of Total Quantity (rounded to next)	
XIV	MANDATORY SPARES FOR 400/220kV ICT		
1	HV Bushing with metal parts and gaskets	3 No.	
2	HV Neutral bushing with metal parts and gaskets (if applicable)	2 No.	
3	MV Bushing with metal parts and gaskets	3 No.	
4	LV bushing with metal parts and gaskets	3 No.	
5	LV Neutral bushing with metal parts and gaskets (if applicable)	-	
6	WTI with contacts	1 No.	
7	OTI with contacts	1 No.	
8	Pressure relief device	1 No.	
9	MOG	1 No.	
10	Buchholz relay complete	1 No.	
11	Oil surge relay	1 No.	
12	Set of gaskets	1 Set	
13	Set of valves	1 Set	
14	Cooler fan with motor	2 No.	
15	Oil Pump with motor	2 No.	
16	Oil flow meter	2 No.	
17	Set of OLTC/OCTC contacts	1 Set (OLTC)	
18	Air cell for conservator	1 No.	
19	Rapid Pressure Rise relay	1 No.	
20	Neutral Grounding Resistor w/o supporting structure	-	
XV	MANDATORY SPARES FOR 125MVAR Bus Reactor		
1	HV Bushing with metal parts and gaskets	3 No.	

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Sl.No.	Item Description	Quantity	Remarks
2	HV Neutral bushing with metal parts and gaskets (if applicable)	1 No.	
3	MV Bushing with metal parts and gaskets	-	
4	LV bushing with metal parts and gaskets	-	
5	LV Neutral bushing with metal parts and gaskets (if applicable)	-	
6	WTI with contacts	1 No.	
7	OTI with contacts	1 No.	
8	Pressure relief device	1 No.	
9	MOG	1 No.	
10	Buchholz relay complete	1 No.	
11	Oil surge relay	-	
12	Set of gaskets	1 Set	
13	Set of valves	1 Set	
14	Cooler fan with motor	-	
15	Oil Pump with motor	-	
16	Oil flow meter	-	
17	Set of OLTC/OCTC contacts	-	
18	Air cell for conservator	1 No.	
19	Rapid Pressure Rise relay	1 No.	
20	Neutral Grounding Resistor w/o supporting structure	-	
<b>XVI</b>	<b>MANDATORY SPARES FOR LT TRANSFORMER</b>		
1	HV Bushing with metal parts and gaskets	3 No.	
2	HV Neutral bushing with metal parts and gaskets (if applicable)	1 No.(as applicable)	
3	MV Bushing with metal parts and gaskets	-	
4	LV bushing with metal parts and gaskets	3 No.	
5	LV Neutral bushing with metal parts and gaskets (if applicable)	1 No.(as applicable)	
6	WTI with contacts	1 No.	
7	OTI with contacts	1 No.	
8	Pressure relief device	1 No.(as applicable)	
9	MOG	1 No.	
10	Buchholz relay complete	1 No.	
11	Oil surge relay	-	
12	Set of gaskets	1 Set	
13	Set of valves	1 Set	
14	Cooler fan with motor	-	
15	Oil Pump with motor	-	
16	Oil flow meter	-	
17	Set of OLTC/OCTC contacts	-	
18	Air cell for conservator	1 No.(as applicable)	
19	Rapid Pressure Rise relay	-	
20	Neutral Grounding Resistor w/o supporting structure	1 No.(as applicable)	
<b>Note:</b>	1. 1 set consists of quantities required for 1 complete transformer/reactor of each type (as applicable). 2. Each mandatory spare OIP bushing shall be provided with suitable "stand".		
<b>XVII</b>	<b>MANDATORY SPARES FOR 220V DC BATTERY</b>		
1	Complete dry cell	2% or 5 Nos.	
2	Inter-cell connectors with Hardware	5% or 10 Nos.	
3	Vent Plug	5% or 10 Nos.	
4	Electrolyte Level indicating float (For opaque containers only)	5% or 10 Nos.	
5	Stand Insulator ( if applicable)	5% or 10 Nos.	
6	Cell Insulator	5% or 10 Nos.	
<b>XVIII</b>	<b>MANDATORY SPARES FOR 48V DC BATTERY</b>		
1	Complete dry cell	2% or 5 Nos.	
2	Inter-cell connectors with Hardware	5% or 10 Nos.	
3	Vent Plug	5% or 10 Nos.	
4	Electrolyte Level indicating float (For opaque containers only)	5% or 10 Nos.	
5	Stand Insulator ( if applicable)	5% or 10 Nos.	
6	Cell Insulator	5% or 10 Nos.	
<b>Note:</b>	Battery spares shall be provided for each set of battery being supplied i.e. for each 220V DC & 48V DC Battery set.		
<b>XIX</b>	<b>MANDATORY SPARES FOR 220V DC BATTERY CHARGER</b>		
1	Set of Electronic Cards / Modules	1 set of each type &	
2	Set of Auxiliary relays	1 set of each type &	
3	Set of Fuse Links and Glass Fuses	3 set of each type	
4	Set of SCR and Diode	3 set of each type and	
5	Rectifier Transformer	1 No. of each type &	
6	Control Transformers	1 No. of each type &	
<b>XX</b>	<b>MANDATORY SPARES FOR 48V DC BATTERY CHARGER</b>		
1	Set of Electronic Cards / Modules	1 set of each type &	
2	Set of Auxiliary relays	1 set of each type &	
3	Set of Fuse Links and Glass Fuses	3 set of each type	
4	Set of SCR and Diode	3 set of each type and	
5	Rectifier Transformer	1 No. of each type &	
6	Control Transformers	1 No. of each type &	
<b>Note:</b>	Battery Charger spares shall be provided for each set of charger being supplied i.e. for each 220V DC & 48V DC Battery Charger set.		
<b>XXI</b>	<b>L.T. SWITCHGEAR / MCCs / DISTRIBUTION BOARDS</b>	<b>1 LOT</b>	
<b>B</b>	<b>LIST OF MANDATORY MAINTENANCE EQUIPMENT</b>		
<b>I</b>	<b>FOR CIRCUIT BREAKER</b>		
1	SF6 Gas filling and evacuating plant (portable)	1 No.	
2	SF6 Gas Recycling and Purifying plant (300 ltrs)	1 No.	
3	SF6 gas leak detector	2 No.	

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SI.No.	Item Description	Quantity	Remarks
4	Operation analyzer with DCRM kit	1 No.	
II	<b>FOR SURGE ARRESTER</b>		
1	Leakage current analyzer (for Gapless Surge Arrester) (The LCM shall be suitable for measuring resistive leakage current of all Las in the switchyard and the accuracy shall be +/-1% of the reading. The technical requirement of LCM shall be as per CBIP manual on HV substation equipment maintenance)	1 No.	
<b>C LIST OF ELECTRICAL TESTING LAB EQUIPMENT</b>			
I	<b>FOR CIRCUIT BREAKERS</b>		
1	Off line SF6 dew point meter for 400kV,220kV circuit breakers.	1 No	
2	Fully automatic contact resistance measurement kit (DC high current) for upto 400 kV circuit breakers	1 No	
3	Fully automatic infrared thermovision scanning system suitable for thermal scanning of switchyard equipments, panels etc. and having facility of data storage on separate card with necessary software for analysis.	1 No	
II	<b>FOR PLCC SYSTEM</b>		
1	Fully automatic digital Level oscillator & level measurement meter for PLCC system.	1 No	