

Mandatory Spares for Substation Package for 400/220 kV Aurangabad (New) Substation , Extn. of 400 kV Aurangabad (MSETCL) Substation and Extn. of 400kV Wardha (PG) Substation associated with Mundra Regional System for WR

MANDATORY SPARES FOR 400kV/220kV AURANGABAD (PG) Site

Sl. No.	Item Description	Unit	Qty.
1.0	LT Transformer		
(a)	800 KVA, 33/0.433 kV	LS (As per Annexure-1)	1
2.0	Circuit Breaker		
a)	420kV Circuit Breaker	LS (As per Annexure-1)	1
b)	245kV Circuit Breaker	LS (As per Annexure-1)	1
3.0	Isolator (Three phase)		
a)	420kV Isolator	LS (As per Annexure-1)	1
b)	245 kV isolator	LS (As per Annexure-1)	1
c)	72.5kV & 33kV Isolator	LS (As per Annexure-1)	1
4.0	Current Transformer (1 Ph.)		
a)	420kV CT(3000A 50kA with 120%)	Nos.	2
b)	245kV CT		
b(i)	1600A 40kA with 120%	No.	1
b(ii)	1600A 40kA with 150%	No.	1
5.0	Capacitive Voltage Transformer		
a(i)	420kV CVT (4400pF)	No.	1
a(ii)	420kV CVT (8800pF)	No.	1
b)	245KV CVT (4400pF)	No.	2
6.0	Surge Arrestor		
a)	336kV Surge Arrestor	LS (As per Annexure-1)	1
b)	216kV Surge Arrestor	LS (As per Annexure-1)	1
7.0	Fire Protection System	LS	1
8.0	Relay & Protection Panels	LS (As per Annexure-1)	1
9.0	Sub-Station Automation System	LS (As per Annexure-1)	1
10.0	LT Switchgear	LS (As per Annexure-1)	1
11.0	PLCC	LS (As per Annexure-1)	1
12.0	Batteries		
a)	220V Batteries	LS (As per Annexure-1)	1
b)	48V bateries	LS (As per Annexure-1)	1
13.0	Battery Charger		
a)	220V Battery Charger	LS (As per Annexure-1)	1
b)	48V Battery Cahrger	LS (As per Annexure-1)	1
15.0	Erection Hardware Items	LS (As per Annexure-1)	1
16.0	400kV BPI	Nos.	4
17.0	220kV BPI	Nos.	3
18.0	Relay test kit	No.	1
	NOTE: LS is quantified in Annexure-1 .		

ANNEXURE – I

BILL OF QUANTITY FOR MANDATORY SPARES FOR 400/220kV Aurangabad (New) S/S

S.NO.	DESCRIPTION	UNIT	QTY
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A. 420 kV SF6 Circuit Breaker(3150 A ,50 kA)

1.	One pole complete, with closing resistor Grading capacitor complete with column and interruptor with MB and operating mechanism and without support structure	No.	1
2.	SF6 Gas	- 40% of ordered quantity	
3.	Trip coils with resistor	Nos.	3
4.	Closing coils with resistor	Nos.	3
5.	Terminal pad & connectors	Nos.	3
6.	Molecular filter for SF6 Circuit for 1 Pole of CB	Sets	3
7.	Density/Pressure monitor for SF6 circuit for 1 pole of CB.	No.	1
8.	Corona rings of each type	Set	1
9.	Fixed moving and arcing contacts Including insulating nozzles for one pole of CB	Set	1
10.	Relays, Power contactors, switch fuse units,limit switches, push buttons, timers & MCB etc.	Set	1
11.	Closing Coil Assembly	No.	1
12.	Trip Coil Assembly	No.	1
13.	Set of Control Valves (of each type)	Set	1
14.	Pressure switches (For one CB)	Set	1
15.	Pressure gauges & Coupling device	Set	1

	of each type		
16.	Aux. contact assembly	No.	1
17.	Operation counter	No.	2
18.	Micro Filter set	Set	1
19.	Micro switches for aux. contact assembly	Set	1
20.	All types of coupling for SF6 gas	Set	1
21.	Pipe length (Copper & Steel)	Set	1

A.1 Pneumatic Operating mechanism (If Applicable)

1.	All types of Valves for Pneumatic Operating mechanism	Set	1
2.	"O" rings, Gaskets & Seals for operating mechanism	Set	1

A.2 Hydraulic Operating mechanism (If Applicable)

1.	Pressure gauges for Hydraulic Operating mechanism and pressure switches	Set	1
2.	"O" rings, Gaskets & Seals for operating mechanism	Set	1
3.	All types of Valves for Hydraulic Operating mechanism	Set	1
4.	Pressure Transducer	No.	1
5.	Pressure switch for Hydraulic circuit/ Pr. Gauges	Set	1
6.	Accumulator	No.	1
7.	Hydraulic Oil	-	40% of initial ordered quantity
8.	Hydraulic filter	Sets	3
9.	Pipe length	Set	1
10.	Dowty Seal	Sets	2

A.3 Spring Operating mechanism (If Applicable)

1.	Closing Dashpot	Set	1
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2.	Opening Dashpot	Set	1
3.	Closing latch gear	Set	1
4.	Opening latch gear	Set	1

B. 420 kV Double Break Isolator((one each of 3150 A & 2000A)

1.	One complete pole with support insulators excluding structure & MOM	No.	1
2.	Copper contact fingers for female & male contacts	Sets	2
3.	Terminal pad with connectors	Set	1
4.	Relays, power contactors, MCBs, switch fuses, push buttons and resistors for electrical control circuit as per approved schematic	Set	1
5.	Timers, Key interlock, Push button switch, Limit switch, Aux. Switches, corona shield, Motor having bearing assembly, etc.	Set	1
6.	Corona shield rings	Nos.	3

C. 245 kV SF6 Circuit Breaker

1.	(a) One complete pole of 1600 Amp CB with pole column and interruptor with MB with operating mechanism and without support structure.	No.	1
	(b) One complete pole of 2500 Amp. CB with pole column and interruptor with MB with operating mechanism and without support structure.	No.	1
2.	SF6 Gas	-	40% of main ordered quantity
3.	Rubber gaskets, 'O' rings and seals for SF6 gas (complete replacement for one breaker)	Set	1
4.	Trip coils with resistor	Nos.	3
5.	Closing coils with resistor	Nos.	2

6.	Terminal pad		
	a) 1600 A	Nos.	3
	b) 2500 A	No.	1
7.	Molecular filter for SF6 C.B.	Sets	3
8.	Density/Pressure monitor for SF6 circuit for 1 pole of CB.	No.	1
9.	Corona rings of each type	Set	1
10.	Fixed moving and arcing contacts Including insulating nozzles for one pole of CB	Set	1
11.	Relays, Power contractors, switch fuse units, limit switches, push buttons, timers & MCB etc.	Set	1
12.	Closing Coil Assembly	No.	1
13.	Trip Coil Assembly	No.	1
14.	Set of Control Valves (of each type)	Set	1
15.	Pressure switches for one CB	Set	1
16.	Pressure gauges & Coupling device of each type	Set	1
17.	Aux. contact assembly	No.	1
18.	Operation counter	Nos.	2
19.	All types of coupling for SF6 gas	Set	1
20.	Pipe length (Copper & Steel) for SF6 circuit	Set	1

C.1 Pneumatic Operating mechanism (If Applicable)

1.	All types of Valves for Pneumatic Operating mechanism	Set	1
2.	Micro filter	No.	1
3.	"O" rings, Gaskets & Seals for operating	Set	1

mechanism

- | | | | |
|----|---|-----|---|
| 4. | Pipe length (copper & Steel)
for penumatic circuit | Set | 1 |
|----|---|-----|---|

C.2 Hydraulic Operating mechanism (If Applicable)

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|----|--|------|--|
| 1. | Pressure gauges for Hydraulic
Operating mechanism | Set | 1 |
| 2. | "O" rings, Gaskets & Seals for operating
mechanism | Set | 1 |
| 3. | All types of Valves for Hydraulic
Operating mechanism | Set | 1 |
| 4. | Pressure Transducer | No. | 1 |
| 5. | Pressure switch for Hydraulic circuit | Set | 1 |
| 6. | Accumulator | No. | 1 |
| 7. | Hydraulic Oil | Kg | 120
(40% of main
ordered quantity) |
| 8. | Ferrule and joints | Set | 1 |
| 9. | Dowty seal | Sets | 2 |

C.3 Spring Operating mechanism (If Applicable)

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|----|--------------------|-----|---|
| 1. | Closing Dashpot | Set | 1 |
| 2. | Opening Dashpot | Set | 1 |
| 3. | Closing latch gear | Set | 1 |
| 4. | Opening latch gear | Set | 1 |

D. 245 KV Double Break Isolators

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|----|--|-----|---|
| 1. | a) One complete pole of 245 KV,
1600 A Isolator with 2 E/S
alongwith support insulator & operating
mechanism for main isolator and earth switch | No. | 1 |
| | b) One complete pole of 245 KV,
2500 A Isolator with 2 E/S | No. | 1 |

alongwith support insulator & operating mechanism for main isolator and earth switch

2.	Copper contact fingers for male & female contacts (1600A).	Sets	2
3.	Relays, Power correctors, switch tests and push button	Set	1
4.	Copper contact fingers for male and female contacts for 2500A Isolator	Set	1
5.	Motor with gear assembly and bevel gear assembly	No.	1
6.	Hinge pins	Nos.	3
7.	Corona shield rings	Nos.	3
8.	Terminal pads and connectors	No.	1
9.	Bearing	Set	1
10.	Current Carrying assembly	Nos.	3

E. 336kV Surge Arrester

1.	3336kV Surge Arrester complete	Nos.	2
2.	Surge Counters	Nos.	3

F. 216kV Surge Arrester

1.	216kV Surge Arrester complete	Nos.	2
2.	Surge Counters	Nos.	3

G. 72.5kV & 33 kV Isolator

1.	Copper contact fingers for male and female (for each rating)	No.	1
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H. Control and Relay Panel

1. Breaker Relay panel spares

i)	Breaker failure relay	No.	1
ii)	Trip circuit supervision relay	Nos.	2

iii)	Auto Reclose relay with check synchronizing relay and dead line charging relay	No.	1
iv)	Self reset trip relay	No.	1 relay of each type
v)	Hand reset trip relay	No.	1 relay of each type
vi)	Timer relay	No.	1 relay of each type
vii)	DC supervision relay	No.	1
viii)	Flag relays	No.	1 relay of each type
ix)	Auxiliary relays	No.	1 relay of each type

2.0 Line Protection Panel Equipment spares

i)	Main 1 Numerical distance relay (Excluding external trip relays)	No.	1
ii)	Main 2 Numerical distance relay (Excluding external trip relays)	No.	1
iii)	Disturbance recorder Acquisition units (If stand alone)	No.	1
iv)	Distance to fault locator (If stand alone)	No.	1
v)	Over voltage protection relay with Timers (stage 1 & stage 2)(If stand alone)	Set	1

3.0 Transformers Protection Panel Spares

i)	Transformers differential protection relay including all aux. CTs	No.	1
ii)	Restricted earth fault protection relay with non-linear resistor	No.	1
iii)	Back up for protection relay with	No.	1

3 O/C and E/F element

iv) Over fluxing relay	No.	1
v) CVT selection relay	No.	1
vi) Over load spare relay with timer	No.	1

4.0 Reactors Protection Panel Spares

i) Reactor differential protection relay with 1 no. Non-linear resistor	No.	1
ii) Restricted earth fault protection relay with non-linear resistor	set	1
iii) Reactor Back up impedance protection relay	set	1

I. PLCC SPARES

1. Set of prints for Carrier terminal	No.	1
2. Set of prints for protection coupler	No.	1
3. Set of prints for EPAX (24/8)	Set	1
4. Coupling device (ph to ph) without base plate	Sets	2
5. Telephone (2 wire) with necessary connecting cable	Sets	4
6. Telephone 4 wire with necessary connecting cable	Sets	2
7. Co-axial connector	Sets	10
8. Co-axial cable	mtr	500
9. PLCC tool kit	Set	1

J. LT Switchgear

1. Relays of each type	Set	1
2. CT, PT (each type)	Set	1
3. Switch, Push buttons, meters	Set	1
4. TPN switch/MCB 1 No. of each rating	Set	1
5. LT CB spares for each rating		
a) Spring charging motor	No.	1
b) Aux. contact set	Sets	2
c) Bus bar seal off insulator	Nos.	5

d)Arc chutes	No.	1
e)Moving contact	No.	1
f)Arcing contact	No.	1
g)Bus bar insulator	Nos.	5
h)Inter phases barrier	Nos.	2
i)Spring (closing/opening) (each type)	No.	1
j)Closing coil	No.	1
k)Tripping coil	No.	1
l)Limit switch	No.	1
m)Jaw contact	No.	1
n) Aux. Finger contact	Set	1
o) Bus bar strip 1 mm (Aluminium)	mt.	5 mt. length

K. Batteries

i) Spares of Battery (220V)		
a) Cells	Nos.	5
b)Terminal connectors with bolts & nuts	Nos.	10
c) Terminal lugs	Nos.	5
(ii) Spares of Battery(50 V)		
a) Cells	Nos.	5
b)Terminal connectors with bolts & nuts	Nos.	10
c) Terminal lugs	Nos.	5

L. Battery Charger

i) Spares of Battery charger (220V)		
a.Set of control cards (All PCB cards)	Set	1

b.Set of relays	Set	1
c.Set of contactor	Set	1
d.Micro switches (If applicable)	Set	1
e.Filter capacitor	No.	1
f.Three phase full wave bridge rectifier (Thyristor/diode)	No.	1
g. Set of wound resistor (If applicable)	Set	1
h. Set of switches	Set	1
i. Potentiometer	No.	1
j. Fuses of thyristor with indicator	Nos.	6
k. Rectifier transformer	No.	1
l. Control transformer	No.	1
m. Series inductor	No.	1
(ii) Spares of Battery charger (50 V)		
a. Set of control cards (All PCB card	Set	1
b. Set of relays	Set	1
c. Set of contactor	Set	1
d. Micro switches (If applicable)	Set	1
e.Filter capacitor	No.	1
f.Three phase full wave bridge rectifier (Thyristor/diode)	No.	1
g.Set of wound resistor (If applicable)	Set	1
h.Set of switches	Set	1
i. Potentiometer	No	1
j.Fuses of thyristor with indicator	Nos.	6

	k. Rectifier transformer	No.	1
	l. Control transformer	No.	1
	m. Series inductor	No.	1
M.	DG Set (NOT APPLICABLE FOR ETC)		
1.	Element L.O. filter	No.	1
2.	Element L.O. bypass filter	No.	1
3.	Element fuel filter	No.	1
4.	Screen filter for fuel pump	No.	1
5.	Coil assembly 24 V	No.	1
6.	Solenoid coil for fuel oil system	No.	1
7.	Voltage regulator complete (AVR)	No.	1
8.	Switches	Set	1
9.	Power contactors	Set	1
10.	Auxiliary contactors	Set	1
11.	Auxiliary relays	Set	1
12.	Timers	Set	1
13.	D.C. starter assembly with clutch engaging and disengaging arrangements complete with motor	No.	1
14.	Coil for the contactors (for both power & aux. contactors	No.	1
15.	Lub oil pressure safety control	No.	1
16.	High water temperature safety control	No.	1
17.	Diode	No.	1
N.	Substation Automation System		
1.	Intelligent Electronics Device (IED)	Set	1
2.	Set of each type optic fire cables of length of longest section used	Set	1
3.	Set of connectors (one of each type) for optic fibre cables	Set	1
4.	Ethernet Switch	No	1
O.	Fire Fighting System (NOT APPLICABLE FOR ETC)		
	1.0 HVW Pumps		
1.1	Shaft sleeves	Set	1
1.2	Gland packing	Set	1
	2.0 Diesel engine drive		

2.1	Self starter	Set	1
3.0	Jockey pumps		
3.1	Shaft sleeves	Set	1
3.2	Gland packing	Set	1
4.0	General		
4.1	Quartzoid bulb detector	No.	10% of total
4.2	Projectors (Nozzeles)	No.	10% of total population
4.3	Smoke detectors Photo electric type	No.	10% of total population
	Ionisation type	No	10% of total population
4.4	Heat detectors	No	10% of total Population
4.5	Electrical control panel:		
	Annunciation printed circuits Boards	Set	1
	(For solid state annunciation) in the control panel		
4.6	Level switch	No	1
4.7	Pressure switch	No	1
4.8	Bronze pipe fitted with nozzle and guide coupling	Nos	2
4.9	Hydrant valve	No	1
4.10	Isolation valves	Set	1
4.11	Deluge valve	Set	1
4.12	Strainer	Set	1
P.	LT Transformer		
1.	Bushings with metal parts (1 no. of each voltage rating)	Set	1

2.	Oil Temperature indicator	Set	1
3.	Diaphragm for pressure relief vent	Set	1
4.	Tap changer contacts	Set	1
5.	Set of valves (1 no. of each type)	Set	1

Q. Erection Hardware Item

5% spares of the actual Quantities for insulator, hardwares, clamps & connectors, spacers, corona bell, At tube, welding sleeves etc.

R. Spares for illumination system (NOT APPLICABLE FOR ETC)

5% of each type of lighting fixture supplied

BILL OF QUANTITY FOR MANDATORY SPARES FOR WARDHA END S/S

A. PLCC equipments

1.	Set of prints for Carrier terminal	Set	1
2.	Set of prints for protection coupler	Set	1
3.	Coupling device (ph to ph)	Set	1
4.	Telephone 4 wire	Nos.	2
5.	Co-axial connector	Sets	2

**BILL OF QUANTITY FOR MANDATORY SPARES FOR AURANGABAD (MSETCL)
END S/S**

A. PLCC equipments

1.	Set of prints for Carrier terminal	Set	1
2.	Set of prints for protection coupler	Set	1
3.	Coupling device (ph to ph)	Set	1
4.	Telephone 4 wire	Nos.	2
5.	Co-axial connector	Sets	2