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TENDER SPECIFICATIONS

TENDER NO. BHEL: NR (SCT): BAWANA: ELECT-CNI: 649

FOR

Erection, testing, commissioning, post commissioning, trial operations and handing over of all Electrical and C&I Equipments, Power Transformers, Isolated Phase Busduct for 1500 MW Pragati-III CCPP of Pragati Power Corporation at Bawana, Delhi

PART II – PRICE BID



**Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northern Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301 (INDIA)**



**ISO 9001, ISO 14001
and OHSAS 18001
certified company
SubContract and
Purchase Deptt.**

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Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301(INDIA)
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IMPORTANT NOTE

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THIS TENDER SPECIFICATION ISSUED TO:

M/S-----

RATE SCHEDULE

List of items for Electrical and Control and Instrumentation package

The quantities mentioned below are tentative and may vary as per the actual engineering / requirement to complete the package for electrical and C & I work. Some of the items may be added or deleted which shall have to be executed by the contractor within his scope of work. The decision of BHEL in this regard shall be final and binding.

| SL NO | ITEM DESCRIPTION | UNIT | QTY | UNIT RATE (IN Rs.) | TOTAL AMOUNT (IN Rs.) |
|--------------|--|-------------|------------|---------------------------|------------------------------|
| | HT/LT TRANSFORMERS: | | | | |
| 1 | 420/16.5kV,220.6MVA,OFAF, GAS TURBINE GENERATOR TRANSFORMER 16000X8000X11000 mm Overall Weight 266MT Shipping Weight 175 MT Oil Qty. 59850 Ltr. | NO. | 04 | | |
| 2 | 420/16.5kV,292.4MVA,OFAF, STEAM TURBINE GENERATOR TRANSFORMER 15500X8000X11000 mm Overall Weight 304MT Shipping Weight 208 MT Oil Qty. 66020 Ltr. | NO. | 02 | | |
| 3 | 16.5/6.9kV,31.5MVA,ONAF, STATION AUX. TRANSFORMER 5200X6200X5200 mm 51MT | NO. | 04 | | |
| 4 | 6.6kV/433V,2000kVA,ONAN 2800X3100X2600 mm 5600KG | NO. | 02 | | |
| 5 | 6.6kV/433V,2000kVA,Dry type 2800X3100X2600 mm 5600KG | No. | 04 | | |
| 6 | 6.6kV/433V, 1600kVA,ONAN 2700X2700X2800 mm 4700KG | NO. | 12 | | |

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| 7 | 6.6kV/433V, 1600kVA,Dry type 2700X2700X2800 mm 4700KG | NO. | 02 | | |
| 8 | 415/415V,100/50kVA,Lighting Transformers | NO. | 01 | | |
| 9 | 7MVA,Isolation Transformer for LCI | No. | 02 | | |
| 10 | EXCITATION TRANSFORMER Dry Type 2500kVA,16.5kV/490V | No. | 06 | | |
| 11 | STATIC EXCITATION SYSTEM FOR GTG consists of regulation cubicle(02)-1951x1200x2295 field breaker cubicle(01)- 1500x1200x2295 field flashing cubicle(01)-3827x1200x2295 AC breaker cubicle(01)- 3827x1200x2295 thyristor cubicle(04)- 3404x1200x2295 transformer cubicle | SET | 04 | | |
| 12 | STATIC EXCITATION SYSTEM for STG consists of regulation cubicle(02)-1951x1200x2295, field breaker cubicle(01)-1500x1200x2295, field flashing cubicle(01)-1150x1200x2295, thyristor cubicle(04)-3404x1200x2295, transformer cubicle | SET | 02 | | |
| | ISOLATED PHASE BUS DUCT FOR GAS TURBINE GENERATOR,SAT AND GENERATOR TRANSFORMER | | | | |
| 13 | Transportation from stores / storage yard to erection site, assembly, erection, welding, testing & commissioning of Isolated Phase Bus Duct (9000A) for interconnection of Generator & Generator Transformer, SAT, LAVT, NGR/NGT along with all accessories & auxiliaries. Conductor size 465 mm, Thk. 15mm, Enclosure size 1000x6.35 , Approx. length per unit 213 Mtrs GTG tap-off(1600A), Conductor size 114.3 ,Thickness 8.56mm ,Enclosure size 680X4.78, Total Approx. length 102 Mtrs | SET | 04 | | |

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| | ISOLATED PHASE BUS DUCT FOR STEAM TURBINE GENERATOR,SAT AND GENERATOR TRANSFORMER | | | | |
| 14 | Transportation from stores / storage yard to erection site, assembly, erection, welding, testing & commissioning of Isolated Phase Bus Duct (11000A) for interconnection of Generator & Generator Transformer, SPVT,NGR/NGT along with all accessories & auxiliaries. Conductor size 530 mm, Thk. 16mm, Enclosure size 1070X6.35, Approx. length per unit 224 Mtr. STG tap-off, Conductor size 114.3,Thickness 8.56mm ,Enclosure size 680X4.78, Total Approx. length 22 m | SET | 02 | | |
| | SEGREGATED PHASE BUS DUCT | | | | |
| 15 | Transportation from stores / storage yard to erection site, assembly, erection, welding, testing & commissioning of Segregated Phase Bus Duct(2750A) for interconnection of Station Aux. Transformers to 6.6kV Switch Boards along with all structures, Misc. accessories C.S 2X127.8 mm Enclosure Size 1350X450 mm Approx. Total Length for both Module 434 Mtrs. | SET | 04 | | |
| 16 | Generator Circuit Breaker including all associated series isolators, earth switches, surge capacitors & SFC connection | SET | 04 | | |
| 17 | Neutral Grounding Resistor(6.6kV) for Station Aux. transformer Earthing | set | 04 | | |
| | LT BUS DUCT | | | | |
| 18 | For Oil filled transformer3000A | SET | 02 | | |
| 19 | For Oil filled transformer,2500A | SET | 12 | | |
| 20 | For Dry type transformer,3000A | SET | 04 | | |
| 21 | For Dry type transformer,2500A | SET | 02 | | |
| | HT SWITCHGEAR | | | | |
| 22 | 6.6 KV SWITCH BOARD EACH BOARD HAVING 36 PANELS (Approx.) Approx. Dimension 26520x2300x2355 mm | SET | 02 | | |

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| | LT SWITCHGEAR | | | | |
|-----------|--|-----|----|--|--|
| 23 | 415 V, 2500 A,GTG PMCC-1DA/2DA/3DA/4DA 20340X1500X2460 | No. | 4 | | |
| 24 | 415 V, 2500 A,STG PMCC-1&2-1DB/2DB 25080X1500X2460 | No. | 2 | | |
| 25 | 415 V, 1000 A STG MCC-1&2-1KA/2KA 16650X1300X2460 | No. | 2 | | |
| 26 | 415 V, 400 A HRSG MCC-1&2 -1HA/2HA 6480X1020X2460 | No. | 2 | | |
| 27 | 415 V, 3000 A STATION SERVICE SWGR-0DA 9540X1020X2460 | No. | 1 | | |
| 28 | 415 V, 3000 A CWPH SWGR-0DB 13380X1020X2460 | No. | 1 | | |
| 29 | 415V, 3000A WATER TREATMENT/FIRE WATER SWGR.-0DC 15390X1020X2460 | No. | 1 | | |
| 30 | 415V,2500 A RWPH SWGR-0DD 8550X1020X2460 | No. | 1 | | |
| 31 | 415V,2000A, DG PCC-0DE 11040X1020X2460 | No. | 1 | | |
| 32 | 415V,1250A,DM PLANT MCC 11040X1020X2460 | No. | 1 | | |
| 33 | 415V ,1000 A AIR CONDITIONING MCC-0SA 7470X1020X2460 | No. | 1 | | |
| 34 | 415V ,1000 A,ETP MCC-0WB 7470X1020X2460 | No. | 1 | | |
| 35 | 415V ,630 A ,MISC. SERVICE MCC-0SD 10530X1020X2460 | No. | 1 | | |
| 36 | 415V ,630 A ,VENTILATION MCC-1&2-0SB/0SC 7290X1020X2460 | No. | 02 | | |
| 37 | 415V ,630 A ,COMPRESSOR MCC-0SF 7470X1020X2460 | No. | 1 | | |
| 38 | 415V ,630 A ,FIRE FIGHTING MCC-0SG 7290X1020X2460 | No. | 1 | | |
| 39 | 415V ,400 A,WATER TREATMENT PLANT-0WA 6480X1020X2460 | No. | 1 | | |
| 40 | 415V ,400 A ,CHLORINATION/CLARIFIED WATER MCC-0SE 6480X1020X2460 | No. | 01 | | |
| 41 | 220V,630 A STATION DC DB-0FA 24300X510X2460 | No. | 1 | | |
| 42 | 125V, MAIN DCDB -1FA/2FA/3FA/4FA 7470X1100X2460 | No. | 04 | | |
| 43 | 125V, AUXILIARY DCDB -1FB/2FB/3FB/4FB | No. | 04 | | |

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|-----------|--|------|-------|--|--|
| | 2430X510X2460 | | | | |
| 44 | Local motor starters (up to 5.5 KW) | No. | 100 | | |
| 45 | Local Push Button Stations | No. | 260 | | |
| | BATTERY SYSTEM | | | | |
| 46 | 220 V, 400A Float-cum-boost Chargers | Set | 2 | | |
| 47 | 220 V STATION Battery System (Ni-Cd)890Ah, two strings of 170 cells ,1.2V | Set | 2 | | |
| 48 | 125 V DC Battery System (GT Starting System) three strings of 98 cells 4000x1000x1100 | Set | 4 | | |
| 49 | 125V DC Float-cum-boost Chargers 3280x750x2430 | Set | 4 | | |
| 50 | 125 V DC Battery System for standby EOP 4000x1000x1100 | Set | 4 | | |
| 51 | 125V DC Float-cum-boost Chargers for standby EOP 3280x750x2430 | Set | 4 | | |
| 52 | 24 V DC Battery System DG set (Ni-Cd) ,362 Ah, 20 cells,1.2 V 2000X500X500 | Set | 6 | | |
| 53 | Battery charger- 40A DG Set 600x500x1000 | Set | 03 | | |
| 54 | Battery charger -20A DG Set 550X400X1000 | Set | 03 | | |
| 55 | 24 V Battery System(two step two tier) with UPS in Control Room | Set | 16 | | |
| | HT POWER CABLES LAYING,DRESSING & CLAMPING | | | | |
| | 6.35/11kV (UE) Armoured, Aluminium Conductor XLPE insulated FRLS outer-sheathed cable. | | | | |
| 56 | 1C x 630 SQ. MM | Mtr. | 17200 | | |
| 57 | 3C x 150 SQ. MM | Mtr. | 8500 | | |
| | HT POWER CABLES TERMINATION | | | | |
| | 6.35/11kV Indoor termination kits for 6.35/11 kV, XLPE insulated, Unarmoured, Al cable | | | | |
| 58 | 1 C X630 SQ MM | No. | 130 | | |
| 59 | 3C X 150 SQ MM | No. | 82 | | |
| | Straight through joints for 6.35/11 kV, XLPE insulated, Unarmoured, Al cable | | | | |

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|----|---|-------|-------|--|--|
| 60 | 1 C X630 SQ MM | No. | 03 | | |
| 61 | 3C X 150 SQ MM | No. | 06 | | |
| | TREFOIL CLAMPS | | | | |
| | TREFOIL CLAMPS for 6.35/11 kV, XLPE insulated, Unarmoured, Al cable | | | | |
| 62 | 1 C X630 SQ MM(Approx. dia. 50+/-2)mm | No. | 4200 | | |
| | TREFOIL CLAMPS for 1.1 kV, XLPE insulated, Unarmoured, Al cable | | | | |
| 63 | 1 C X630 SQ MM(approx. dia.40+/-2)mm | No. | 3700 | | |
| 64 | 1 C X400 SQ MM(approx. dia.32.5+/-2)mm | No. | 2850 | | |
| | LT POWER CABLES LAYING,DRESSING & CLAMPING | | | | |
| | 1.1 kV, Unarmoured, Stranded Al conductor, XLPE insulation, Inner sheath PVC & PVC outer sheath, FRLS | | | | |
| 65 | 1 C X630 SQ MM | Mtr | 10000 | | |
| 66 | 1 C X400 SQ MM | Mtr | 7600 | | |
| 67 | 1CX300 SQ.MM | Mtrs. | 2000 | | |
| 68 | 1CX185 SQ.MM, | Mtrs. | 6000 | | |
| 69 | 3C X 240 SQ MM | Mtr | 2200 | | |
| 70 | 3C X 150 SQ MM | Mtr | 4500 | | |
| 71 | 3.5CX240 SQ.MM, | Mtrs. | 1500 | | |
| 72 | 3.5CX 185 SQ MM | Mtr | 1800 | | |
| | 1.1 kV, Unarmoured, Stranded Cu conductor, XLPE insulation, Inner sheath PVC & PVC outer sheath, FRLS | | | | |
| 73 | 1 C X630 SQ MM | Mtr | 450 | | |
| | 1.1 kV, Unarmoured, Stranded Al conductor, PVC insulation, Inner sheath PVC & PVC outer sheath, FRLS | | | | |
| 74 | 2 C X10 SQ MM | Mtr | 1800 | | |
| 75 | 2 C X25 SQ MM | Mtr | 3600 | | |
| 76 | 3 C X10 SQ MM | Mtr | 4500 | | |
| 77 | 3CX16 SQ.MM | Mtrs. | 4000 | | |
| 78 | 3 C X25 SQ MM | Mtr | 9000 | | |
| 79 | 3CX35 SQ.MM | Mtrs. | 7500 | | |
| 80 | 3 C X50 SQ MM | Mtr | 7500 | | |
| 81 | 3 C X95 SQ MM | Mtr | 9000 | | |
| 82 | 3CX150 SQ.MM | Mtrs. | 2500 | | |
| 83 | 3.5 C X25 SQ MM | Mtr | 9000 | | |
| 84 | 3.5 C X50 SQ MM | Mtr | 18000 | | |
| 85 | 3.5 C X95 SQ MM | Mtr | 4500 | | |
| | 1.1 kV, Unarmoured, Stranded Cu conductor, PVC | | | | |

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| | insulation, Inner sheath PVC & PVC outer sheath, FRLS | | | | |
| 86 | 2 C X2.5 SQ MM | Mtr | 18000 | | |
| 87 | 2 C X25 SQ MM | Mtr | 2700 | | |
| 88 | 2 C X50 SQ MM | Mtr | 1800 | | |
| 89 | 2 C X95 SQ MM | Mtr | 4500 | | |
| 90 | 3 C X2.5 SQ MM | Mtr | 27000 | | |
| | 1.1 kV, Armoured, Stranded Al conductor, PVC insulation, Inner sheath PVC & PVC outer sheath | | | | |
| 91 | 3.5 C X25 SQ MM | Mtr | 7200 | | |
| 92 | 3.5 C X50 SQ MM | Mtr | 2700 | | |
| | 1.1 kV, Armoured, Stranded Cu conductor, PVC insulation, Inner sheath PVC & PVC outer sheath, | | | | |
| 93 | 3 C X2.5 SQ MM | Mtr | 22000 | | |
| | SCREENED CONTROL CABLE ,TYPE F , MULTI PAIR(TWISTED) INDIVIDUAL & OVERALL SHIELDED,UNARMOURED | | | | |
| 94 | 4P,0.5 SQ MM | Mtr | 40000 | | |
| 95 | 8P,0.5 SQ MM | Mtr | 50000 | | |
| 96 | 12P,0.5 SQ MM | Mtr | 15000 | | |
| 97 | 20P,0.5 SQ MM | Mtr | 10000 | | |
| | SCREENED CONTROL CABLE ,TYPE G , MULTIPAIR(TWISTED)OVERALL SHIELDED,UNARMOURED | | | | |
| 98 | 2P,0.5 SQ MM | Mtr | 65000 | | |
| 99 | 4P,0.5 SQ MM | Mtr | 245000 | | |
| 100 | 8P,0.5 SQ MM | Mtr | 8000 | | |
| | LT CONTROL CABLE | | | | |
| 101 | 24CX2.5 SQ.MM | Mtrs. | 3000 | | |
| 102 | 19CX2.5 SQ.MM | Mtrs. | 5000 | | |
| 103 | 19C-1.5 SQ MM | Mtr | 10000 | | |
| 104 | 12CX2.5 SQ.MM | Mtrs. | 3000 | | |
| 105 | 12C-1.5 SQ MM | Mtr | 25000 | | |
| 106 | 7CX2.5 SQ.MM | Mtrs. | 5000 | | |
| 107 | 7C-1.5 SQ MM | Mtr | 13000 | | |
| 108 | 5C-2.5 SQ MM | Mtr | 60000 | | |
| 109 | 5C-1.5 SQ MM | Mtr | 40000 | | |
| 110 | 3CX2.5 SQ.MM | Mtrs. | 6500 | | |
| 111 | 3C-1.5 SQ MM | Mtr | 25000 | | |
| 112 | 2C-1.5 SQ MM | Mtr | 25000 | | |
| 113 | 24PX1.5 SQ.MM, | Mtrs. | 4500 | | |
| 114 | 18PX1.5 SQ.MM | Mtrs. | 3500 | | |
| 115 | 12PX1.5 SQ.MM | Mtrs. | 20000 | | |
| 116 | 12PX0.5 SQ.MM | Mtrs. | 10000 | | |
| 117 | 10PX1.5 SQ.MM, | Mtrs. | 3000 | | |
| 118 | 8PX1.5 SQ.MM | Mtrs. | 3000 | | |

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| 119 | 6PX 1.5 SQ.MM, | Mtrs. | 30000 | | |
| 120 | 4PX 1.5 SQ.MM, | Mtrs. | 2500 | | |
| 121 | 2PX1.5 SQ.MM | Mtrs. | 7500 | | |
| 122 | 1PX1.5 SQ.MM, | Mtrs. | 10000 | | |
| 123 | 1PX0.5 SQ.MM | Mtrs. | 5000 | | |
| 124 | 12 Core/2Pair ,Overall shielded , 0.5 SQ.MM | Mtrs. | 12000 | | |
| 125 | 8 Core/2Pair ,Overall shielded , 0.5 SQ.MM | Mtrs. | 24000 | | |
| 126 | 4 Core/2Pair ,Overall shielded , 0.5 SQ.MM | Mtrs. | 24000 | | |
| 127 | 2 Core/2Pair ,Overall shielded , 0.5 SQ.MM | Mtrs. | 16000 | | |
| 128 | 6TX1.5 SQ.MM | Mtrs. | 5500 | | |
| 129 | 2TX1.5 SQ.MM | Mtrs. | 4000 | | |
| 130 | 1 Triad cable | Mtrs. | 5000 | | |
| 131 | 8 Triad cable | Mtrs. | 1000 | | |
| 132 | Compensating Cable(1Px16AWG) for instrument | Mtr. | 1250 | | |
| 133 | Compensating Cable(8Px18AWG) for instrument | Mtr. | 500 | | |
| 134 | Compensating Cable(2Px18AWG) for instrument | Mtr. | 500 | | |
| 135 | Screened Cable for instrument | Mtr. | 1200 | | |
| | CABLE TRAYS ERECTION INCLUDING SUPPORT & COVERS FABRICATION | | | | |
| 136 | Galvanised Ladder/Perforated type cable tray, W=600mm | Mtr | 37800 | | |
| 137 | Galvanised Ladder/ Perforated type cable tray, W=450mm | Mtr | 3600 | | |
| 138 | Galvanised Ladder/ Perforated type cable tray, W=300mm | Mtr | 1950 | | |
| 139 | Galvanised Ladder/ Perforated type cable tray, W=150mm | Mtr | 4200 | | |
| | CABLE TRAY ACCESSORIES | | | | |
| | Ladder/ Perforated type Horizontal 90 deg bend-600 mm radius, Vertical 90 deg bend-600 mm radius, Tees -600 mm radius, Cross -600 mm radius | | | | |
| 140 | 600 mm wide | No. | 516 | | |
| 141 | 450 mm wide | No. | 150 | | |
| 142 | 300 mm wide | No. | 91 | | |
| 143 | 150 mm wide | No. | 65 | | |
| | Ladder/Perforated type reducers(50% LHS/50%RHS) | | | | |
| 144 | 600-450 mm wide | No. | 30 | | |
| 145 | 600-300 mm wide | No. | 30 | | |
| 146 | 450-300 mm wide | No. | 20 | | |
| 147 | 300-150 mm wide | No | 10 | | |

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| 148 | Hot dip galvanized MS sheet 1.6mm thk for covering of cable shaft etc. | Sq.m m | 280 | | |
| | EQUIPMENT EARTHING | | | | |
| 149 | GS FLAT 65 X 8 mm | MT | 50 | | |
| 150 | GS FLAT 50 X 6 mm | MT | 10 | | |
| 151 | GS FLAT 25 X 6 mm | MT | 3 | | |
| 152 | GS FLAT 25 X3 mm | MT | 2 | | |
| 153 | 14 SWG GI WIRE | Mtr | 1000 | | |
| 154 | 8 SWG GI WIRE | Mtr | 2500 | | |
| 155 | 20 MM DIA. 1000 MM LONG GS ROD | Mtr | 105 | | |
| 156 | GI pipe(1/2",1") | Mtr | 30 | | |
| 157 | GI pipe(1.5",2") | Mtr | 20 | | |
| 158 | Electrodes in Test Pits GI pipe,100D,1.3MM Thick & 3.75 Long | No. | 20 | | |
| | C & I ITEM DESCRIPTION | | | | |
| | CONTROL PANELS/RACKS/CONSOLES | | | | |
| 159 | MARK-VI Gas TURBINE CONTROL PANEL ALONGWITH<HMI>STATION&NETWORK SWITCH,PRINTER 5820X2400x600 | SET | 04 | | |
| 160 | AUX. Rack(Rotor vibration Monitoring System, Gas detection monitors) 1000x915X2400 | SET | 04 | | |
| 161 | Diverter Damper Control PANEL 1000x450X2354 | SET | 04 | | |
| 162 | Gullotine Damper Control PANEL 1000x450X2354 | SET | 04 | | |
| 163 | GT CO2 Fire Protection Panel 600X300X1200, | No. | 04 | | |
| 164 | DCS Panel for HRSG,TG,STATION CNI 750X800X2415 | No. | 172 | | |
| 165 | I.P. RELAY, DCS PANEL 800X800X2415 | No. | 06 | | |
| 166 | 240V UPS PANEL FOR HRSG,TG & BOP 6580X900X2230 | No. | 02 | | |
| 167 | ACDB 2280X895X2115 | No. | 02 | | |
| 168 | HART MANAGEMENT SYSTEM PANEL 1200X800X2415 | No. | 02 | | |
| 169 | GEN GT,SAT PROTECTION PANELS 1000X1000X2295 | No. | 06 | | |
| 170 | UNIT CONTROL PANEL 2000X1000X2345 | No. | 01 | | |
| 171 | ELECTRICAL CONTROL PANEL 2000X1000X2345 | No. | 01 | | |

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| 172 | AVR PANEL 3100X750X2295 | No. | 06 | | |
| 173 | FIRE ALARM PROTECTION PANEL 1650X800X2350 | No. | 01 | | |
| 174 | FIRE PROTECTION WORKSTATION& PRINTER 1505X760X735 | No. | 01 | | |
| 175 | VMS PANELS FOR TG,BFP/CEP MOTORS 800X800X2415 | No. | 10 | | |
| 176 | GPS MASTER CLOCK PANEL 900X600X2415 | No. | 02 | | |
| 177 | PA SYSTEM CENTRAL EXCHANGE 545X545X1215 | No. | 02 | | |
| 178 | TSS & VIBRATION MONITORING STATION 1505X760X735 | No. | 04 | | |
| 179 | NETWORK PANEL 800X800X2415 | No. | 06 | | |
| 180 | HART MANAGEMENT STATION 1505X760X735 | No. | 02 | | |
| 181 | PRINTERS(A4 & A3 COLOUR LASER, INKJET ,DOT MATRIX) WITH PRINTER TABLE and accessories | No. | 28 | | |
| 182 | ENGG./MAXLINK/MAX STORIAN/Operator/WORKSTATION/PC STATION/NOTEBOOK PC/LAN ,24" TFT monitor | No. | 67 | | |
| 183 | CONTROL DESK | No. | 01 | | |
| 184 | DG MCC PANEL 3450X690X2375 | No. | 03 | | |
| 185 | DG AMF PANEL 900X690X2030 | No. | 03 | | |
| 186 | Starter Panel for DC Jacking Oil Motor, Emergency Lube Oil Motor 1000X800X2200 | Set | 04 | | |
| 187 | LCI PANEL ,<HMI> Station, Printers, Networking Interface 4400X2347X1400 | SET | 02 | | |
| 188 | AC REACTOR 1250X1550X1250 | SET | 02 | | |
| 189 | DC REACTOR 1850X2300X1850 | SET | 02 | | |
| 190 | DC Charger & DCDB 3250x840x1800 | No. | 08 | | |
| 191 | 24 V DC Battery ISO Box 700X350X1000 | No. | 08 | | |

| | INSTALLATION,CALIBRATION& COMMISSIONING OF LOCAL/FIELD INSTRUMENTATION/EQUIPMENT | | | | |
|------------|---|-----|------|--|--|
| 192 | Flow meters/Flow transmitters | No. | 22 | | |
| 193 | Temperature gauges/Pressure gauges/ Diff. Pressure gauge | No. | 874 | | |
| 194 | Temp. Transmitter /Pressure Transmitters / Differential pressure transmitters | No. | 1191 | | |
| 195 | Level Transmitter/Level gauge | No. | 42 | | |
| 196 | Online Gas Chromatograph | No. | 2 | | |
| 197 | Rotameter | set | 8 | | |
| 198 | Temp. switches/Pressure switches /DP switches | No. | 360 | | |
| 199 | Level switch/Level switch(Conductivity type)/ Level switch(Float type) / Level Instruments | No. | 91 | | |
| 200 | Temp. /Level Indicator | No. | 18 | | |
| 201 | Flue gas Analyser Sample Handling System (Sox/Nox/CO) at Chimney | set | 04 | | |
| 202 | Oxygen Analyser | No. | 04 | | |
| 203 | SWAS Sample Handling System | Set | 02 | | |
| 204 | Analyser(Conductivity/ Dissolved oxygen/ Hydrazine/ Sodium/ Silica/ pH/Flue gas) | No. | 100 | | |
| 205 | Thermocouples/RTD's | No. | 586 | | |
| 206 | Thermocouple K Type | No. | 66 | | |
| 207 | Ch/Al Thermo Couple(Dupl:Ex) | No. | 128 | | |
| 208 | MTM Thermo Couple (Duplex | No. | 180 | | |
| 209 | Wheel space, Inner barrel, Bearing Drain, Exhaust, Bearing Metal thermocouples | No. | 204 | | |
| 210 | Air Filter Regulators | No. | 60 | | |
| 211 | Thermowells | No. | 60 | | |
| 212 | I/P Converters | No. | 100 | | |
| 213 | LVDTs | No. | 64 | | |
| 214 | Vibration Transducers/Monitor/ Detectors | No. | 72 | | |
| 215 | Solenoids junction boxes | No. | 80 | | |
| 216 | Haz Gas detectors | No. | 56 | | |
| 217 | Vent fan pressure devices | No. | 32 | | |
| 218 | Flame detectors | No. | 16 | | |
| 219 | Spark plugs | No. | 08 | | |
| 220 | Magnetic speed pickups | No. | 104 | | |
| 221 | Vibration probes, Bentley vibration probes | No. | 96 | | |
| 222 | Fire detectors | No. | 40 | | |
| 223 | Solenoid | No. | 808 | | |
| 224 | Limit switches | No. | 20 | | |
| 225 | CPD transmitter Box | No. | 12 | | |

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| 226 | Performance transmitter Box | No. | 40 | | |
| 227 | Gas pressure DP transmitter Box | No. | 12 | | |
| 228 | Hooters/strobes | No. | 40 | | |
| 229 | Manual call points | No. | 40 | | |
| 230 | Condensing Pot-Steam | No. | 38 | | |
| 231 | Orifice Plate Assembly-Water & steam | No. | 34 | | |
| 232 | Nozzle Assembly | No. | 44 | | |
| 233 | Transmitter enclosure & fittings | No. | 48 | | |
| 234 | EWLI /DWLG for drum | No. | 24 | | |
| 235 | CCTV System | SET | 01 | | |
| 236 | Hand held Communicator | SET | 04 | | |
| 237 | Master Slave Clock System | SET | 01 | | |
| 238 | Instrument Rack | No. | 24 | | |
| 239 | Electronic Transmitters/Guided wave radar transmitters | No. | 04 | | |
| 240 | Local Instrument Enclosure 1450X800X2300 | No. | 04 | | |
| 241 | Local Instrument Enclosure 1100X800X2300 | No. | 18 | | |
| 242 | Local Instrument Enclosure 700X600X2000 | No. | 44 | | |
| 243 | Local Instrument Rack 1950X650X2200 | No. | 02 | | |
| 244 | Local Instrument Rack 1650X650X2200 | No. | 46 | | |
| 245 | Local Instrument Rack 1150X650X1600 | No. | 66 | | |
| | CABLE TRAY | | | | |
| 246 | 12 SWG 50mm,100mm Cable Tray(Perforated Type) | No. | 250 | | |
| 247 | Cable Tray(Perforated Type) Accessories | No. | 1050 | | |
| | IMPULSE PIPES/ TUBES ALONG WITH FITTINGS | | | | |
| 248 | SS PIPE 33.4X3.4MM(Above 1") | MTR S | 10000 | | |
| 249 | SS TUBE 12.7X2.1MM(Approx.1/2") | MTR S | 2000 | | |
| 250 | SS PIPE 21.3X3.7MM(Above 3/4") | MTR S | 1000 | | |
| 251 | GI Tubing & Fittings/ SS/AS/CS Tubing & Fittings for instrument air lines/ | No. | 187 | | |
| 252 | NB 1" GI pipe | MTR S | 150 | | |
| 253 | 6mm(1/4") OD SS Tube | MTR S | 50 | | |

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| 254 | Copper Tube-6mm/8mm,1/4",1/2" to 1" | MTR S | 1000 | | |
| 255 | P22-1/2" | MTR S | 20 | | |
| 256 | Flexible conduiting /Rubber hoses/pipes | MTR S | 500 | | |
| 257 | Rigid conduit | MTR S | 250 | | |
| | JUNCTION BOXES/INDICATION BOXES/LOCAL CONTROL STATIONS | | | | |
| 258 | JB 24 way | No. | 120 | | |
| 259 | Junction boxes up to 48 way | No. | 324 | | |
| 260 | Junction Boxes 40 terminals | No. | 60 | | |
| | COMMISSIONING/CALIBRATION OF MOTORISED ACTUATOR/GATE/CONTROL VALVES | | | | |
| 261 | Commissioning of Motorised Valves | No. | 508 | | |
| 262 | Commissioning/ Calibration of Pneumatic Gates /Valves | No. | 28 | | |
| 263 | Commissioning of Control Valves | No. | 170 | | |
| | INSTALLATION & FABRICATION OF STRUCTURE STEEL | | | | |
| 264 | ANGLE ,ISMC,PLATES etc. | MT | 40 | | |
| 265 | Lab Instruments | SET | 01 | | |
| | Pneumatic Test Bench | | 1 | | |
| | Dead Weight Tester | | 1 | | |
| | Vacuum Tester | | 1 | | |
| | Hydraulic Pressure Gauge Tester | | 2 | | |
| | Vacuum Pump | | 1 | | |
| | Manometers | | | | |
| | Test Manometer | | 2 | | |
| | U -Tube Manometer | | 2 | | |
| | Sub-standard quality pressure gauges of following ranges | | | | |
| | 0 - 250 kglcm² | | 2 | | |
| | 0 - 200 kglcm² | | 2 | | |
| | 0 - 100 kglcm² | | 2 | | |
| | 0 - 50 kglcm² | | 2 | | |
| | 0 - 10 kglcm² | | 2 | | |
| | 0 - 5 kglcm² | | 2 | | |
| | 0 - 2 kglcm² | | 2 | | |
| | 0 - 1 kglcm² | | 2 | | |
| | (-)l - 0 kglcm² | | 4 | | |
| | Alr Set 4 | | 4 | | |
| | Portable Electro-pneumatic Calibrator | | 2 | | |

| | | | | |
|---|--|----|--|--|
| Fluidised Temperature bath | | 1 | | |
| Thermocouple Test Furnace | | 1 | | |
| Barometer | | 1 | | |
| Mercury Thermometer (each range) 2 Sets of each of 12 numbers | | 24 | | |
| Precision Instrument Radial Drilling Machine | | 1 | | |
| Jeweler's Lathe | | 1 | | |
| Standard tool box for instrument maintenance work | | 3 | | |
| Digital Thermometer and Hygrometer | | 2 | | |
| Portable Dry block type Temperature calibrator | | | | |
| Low temp. portable dry block type calibrator | | 1 | | |
| High temp, portable dry block type calibrator 1 | | 1 | | |
| Portable Infrared Thermometer | | 1 | | |
| Portable Flue Gas Analyser | | 2 | | |
| Engraving machine | | 1 | | |
| Drawing Lamlnator | | 1 | | |
| Bench Magnifier | | 1 | | |
| Industrial Vacuum cleaner | | 1 | | |
| Electronic Test Bench | | 1 | | |
| Multimeter | | 1 | | |
| Digital Multimeter, 4½ digits | | 6 | | |
| Digital Multimeter, 5½ digits | | 1 | | |
| Digital Multimeter, 6½ digits | | 1 | | |
| Portable Digital Multimeter, 3½ digits | | 6 | | |
| Portable Digital Multimeter, 4½ digits | | 10 | | |
| Portable Current/mV Calibrator | | 10 | | |
| Resistance Thermometer Bridge | | 2 | | |
| Decade Resistance Box | | 2 | | |
| Decade Capacitance Box | | 2 | | |
| Decade Inductance Box | | 2 | | |
| Variac | | 2 | | |
| Rheostat/Potentiometer | | 10 | | |
| Test RTD | | 2 | | |
| Portable Thermocouple/RTD calibrator/Simulator | | 1 | | |
| Portable MultiFunction Counter | | 1 | | |
| Digital Storage Oscilloscope | | 2 | | |
| Power Pack | | 2 | | |
| Portable Vibration Meter | | 2 | | |
| Portable Vibration Analyser | | 1 | | |
| RCL Meter | | 1 | | |
| Logic Probe | | 4 | | |
| Function Generator | | 2 | | |
| Clip On AC Power Meter | | 1 | | |

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| LAN/Co-axial Cable Meter/Tester | | 1 | | |
| Digital Insulation Tester | | 2 | | |
| EPR0M Programmer | | 1 | | |
| Wakie Talkie System | | 15 | | |
| Stop Watches | | 3 | | |
| Standard Toolbox for Instrument Maintenance Work | | 3 | | |
| Soldering and Desoldering Stations with all accessories | | 2 | | |
| Portable Digital Tachometer | | 2 | | |
| pH Simulator | | 1 | | |
| MultiChannel Simulation Unit(Analog) | | 1 | | |
| In circuit IC Tester | | 1 | | |
| Portable High Speed Trend Recorder | | 1 | | |
| Digital Channel Simulator | | 1 | | |
| PhotoCopying Machine | | 2 | | |
| PCs | | 2 | | |
| Portable Handheld Oscilloscope | | 1 | | |
| Drawing Scanner (A3 Size) | | 1 | | |
| Drawing Laminator | | 1 | | |
| Bench Magnifier | | 1 | | |
| | | | Grand Total | |

Notes:

1. All dimensions are in mm unless otherwise specified.
2. In case of omission in quoting any rate, the evaluation will be done considering the highest quoted rate obtained against that item but the work, if awarded, will be on the lowest quoted rate obtained against that item.
3. In case of difference in rates between words and figures, the lesser of the two will be treated as valid rate.
4. The bidders shall enter both 'Unit Rate' & 'Amount'. In case of any mismatch between 'Total Amount based on Unit Rate' & 'Total Amount as quoted', the higher of the two shall be considered for evaluation and the lower of the two shall be considered for award.
5. Sub-total on each page shall be indicated and brought forward to next page and duly signed. The contractor shall ensure that grand total on this page is arithmetically checked and corrected and certified accordingly while signing below by the bidders. Despite this, if any calculation error is noticed in totalling after tender opening, the higher of the two(i.e. between total value worked out by BHEL and the total value indicated by bidder in their offer) shall be considered for evaluation and the lower of the two shall be considered.
6. Evaluation of the bids shall be done based on total price against this BOQ.

7. The quantities indicated against each item above are tentative and same are liable to vary depending upon the site requirement. The contractor has to erect/commission all items indicated by BHEL Engineer for achieving unit wise milestone.