

Warehouse Abyan

1. Solar PV Modules:

- Quantity: 4 pieces.
- Module capacity should not be less than 710 W at STC
- Must conform to IEC 61215, 61730, 61701, 62716, ISO 9001, ISO 14001, and ISO 45001 certificates or equivalent.
- The PV manufacturer should be approved as tier-1;
- The module type shall be monocrystalline, n-type, TOP Con and bifacial dual glass.
- Module efficiency: should not be less than 22%.
- The PV modules junction box not less than IP68 & with 3 diodes. نئند
- Module Voltage: Not less than 1500 VDC (IEC).
- VOC: -0.25% /C° or less.
- Nominal operating cell temperature (NOCT): Not more than 45°C.
- Tolerance of maximum power rating: 0-5 W.
- Operating temperature: -40C° to 85C°.
- Weatherproof DC rated MC4 connector & Fully Secured, not allowing for any loose connections & PID resistance.
- Certificates and Data sheet of PV module that contains the P-V & I-V Curves, material and thickness of the frame and glass layer, all electrical and mechanical Data, Dimensions and Module area should be provided by bidders.
- Performance warranty: Nominal power output 90% for 10 years, 80% for 25 years.

2. Lithium-ion Batteries with Rack (LiFePO4)

- Quantity 2 pieces.
- Type: Low-Voltage (LV) Lithium Iron Phosphate (LiFePO4) battery.
- Nominal Energy: 5120 Who per piece.
- Nominal Capacity: 100 Ah per piece.
- Nominal Voltage: 51.2 V.
- Operating Voltage Range: 40 - 58.4 V.
- Max. Continuous Charge/Discharge Current: 150 Amps.
- Max. Parallel Quantity: 15 batteries.
- Cycle Life: More than 10,000 cycles at 25°C.
- Protection Degree: not less IP52.
- Installation Method: Can be wall-mounted or floor-mounted. Battery Chemistry: LiFePO4.

3. System Cables:

- All cables shall be marked properly according to the approved design so that cable can be easily traced and identified.
- All outdoor exposed wiring to be protected from UV radiation and physical damage.
- All cables above ground should be suitably mounted inside cable trays with proper covers, or inside UPVC conduit with 60 % clearance.
- Underground cables should be housed inside UPVC conduit with 60 % clearance.
- All underground cables shall have warning tape installed.
- All cables inside the control room shall be installed inside cable trays.
- All cables outside the control room shall be installed inside UPVC conduit with 60 % clearance.
- Ends of cables' connections are to be made through suitable lugs or terminals, crimped properly with use of cable glands and heat shrink tubing.

3.1. AC Cables

- Flexible copper conductor and shall be double insulating material (PVC insulated and PVC sheathed) CU/PVC/PVC.
- Voltage rating:450/750VAC.
- Conductor: Plain annealed flexible copper conductor class 5 as per BS EN 60228.
- Insulation: Extruded layer of Polyvinyl chloride (PVC) insulation with temperature rating at least 90 °C at normal operation as per BS EN 50363-3 type T11.
- Sheath: Extruded layer of Polyvinyl chloride (PVC) compound applied over the laid up assembled cores with temperature rating at least 90 °C at normal operation as per BS EN 50363-4-1 type TM2.
- Flame retardancy: flame performance standards BS EN 60332-1 or equivalent.
- Certification Standard: BS EN 50525-2-11 or equivalent.
- The brand shall be (Bahra, Alfamar or equivalent).

3.2. DC Cables

- Cable type: H1Z2Z2-K.
- The cable shall be designed for outdoor use and weather resistance.
- The rated voltage shall be at least 1500VDC.
- The maximum voltage shall be at least 1800VDC.
- The cable shall be flame & fire non-propagation, chemical & oil resistance and UV &Ozone resistant.
- The maximum service temperature shall be 120°C.
- Conductor: Flexible Tinned copper Class 5 (K) as per EN 60228.
- Insulation: Halogen-free cross-linked LSOH-XL compound.
- Outer sheath: Halogen-free cross-linked LSOH-XL compound. Sheath' colors shall be black & red.
- TUV certified according to IEC 62930 & BS EN 50618 or equivalent.
- The brand shall be (Bahra or equivalent).

3.3. Cable Tray

- Perforated type Galvanized steel cable trays including cable tray covers, clamping bolts and other cable tray accessories such as coupler plates, bends, tees, reducers, vertical elbows in manufactured accordance with ASTM A653 SS, Grade 33, coating designation G90.

- *Hot-dip Galvanized Steel: Straight section and fitting side rails and rungs shall be made from steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 for 14 gauge and heavier, ASTM A1008, Grade 33, Type 2 for 16 gauge and lighter, and shall be hot-dip galvanized after fabrication in accordance with ASTM A123.*
- *Perforated cable trays must conform to IEC 61537 and EN ISO 1461 standard.*
- *The size of cable tray shall be according to the number of cables (X 1.5) for future expansion.*
- *The brand shall be (Bahra or equivalent).*
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4. Supplying and installing solar panel holders to achieve the best solar

- *Best angle for the seasons of the year . and installing galvanized*
- *metal structure Columns (H80*100) and Beams Of rails (H40*140),*
- *Tube (GAL.40*80*1.5), support angles (L50*50*4), and flanges. The*
- *price also includes cutting, welding, grinding, drilling, lifting and fixing*
- *in place on height levels. The price includes all connections nuts, bolts,*
- *nuts and welds that necessary for manufacturing, installation and all*
- *required works according to the engineering drawings, technical*
- *specifications and the instruction of the supervising engineer*