**Electro mechanical works for groundwater well no. 19-17/024 in Al-Jeftlik**

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| **Item** | **Description** | **Unit** | **Unit Price /$US** | **Qty.** | **Total**  **/$US** |
| **Electrical and Mechanical Works:**  The contractor shall submit in his offer and supply maintenance manuals, catalogs, characteristic curves, testing certificates, shipping, lading documents and specifications of pumps, motor, fittings, mechanical and electrical control devices, cables, wiring and all accessories and ancillaries to complete the work. All to be new and not renewed in accordance with the specified specifications. The contractor should verify the design equipments by conducting field visits to the well and must be before ordering any equipment or materials as follows: the contactor must check and verify and match between the reality and the design quantities mentioned in this tender. If he notices any difference or no matching, then he must inform the supervisor engineer and find together a suitable solution to such conditions. This include checking and fitting all dimensions mentioned in the tender as the well's hole diameter, pump diameter, columns diameter, discharge head inlet and outlet. The contractor must check in particular that the size of the hole of the well is enough to install the pumping pipes, and the water level pipes together. The sizes mentioned in this contract are the best estimate of information we got for this well. The contractor should be responsible technically and financially to supply the suitable materials. All connections including the electrical and mechanical fittings should be according to the general pumping layout view. | | | | | |
|  | **Main Electrical Control Panel Unit**: Supply and install suitable main electrical control panel for **40 m3/hr at 13 bars**, and installing in the site for the mode of operation, a control board according to the following specifications and supervisor instructions: control panel box shall be made of three compartments and the price for this item include all equipments and works mentioned below: The first Compartment is for the main hour meter and fusses- breaker. The second compartment is for the **40 hp** inverter as ABB, or equivalent as shown specifications A4-1, main breaker as Siemens, contactor, capacitor(s) bank, main cables inlet/outlet.), It shall be IP56 protected, thermally painted paint as (RAL 7302). All main cables and wiring must be closed with special plastic cover and protected against human electric shock. The third compartment includes all control circuits, and secondary contactor, breakers for the high voltage cabinet or the low voltage. The control panel must be fixed to the wall by six Jumbo screws and laid on a reinforced concrete foundation 40-50 cm above the ground. The three compartments must be tightly closed from all side. The contractor should submit as built drawing including soft and hard copy. In case the contractor will use any digital equipment including PLC he must submit the cable, the software, or any other accessories that are necessary to operate and maintain these digital equipments.  The labeled nameplate should be mounted at the front of the main board behind the doors and above every switch and group of lamps. Control electric lamps 24v must be fixed to control all operation system, the starter shall be used to start, run, stop , protect and control manually and automatically by using the general required installation of the following equipments completely:   * The power circuit must consist of the following: main circuit breaker MCCB 3\*150A, 25KA adjustable for the company and for generator (MOLLER ) two pieces. The price includes supplying and installing manual change over switch 4\*150A, SOCOMEC type for manual operation. * Bus bar 150A/0.4KV (3 phases and neutral and earth) * complete 4p \* 20KA surge arrestors of replaceable type. With box fuse 3\*63. * Digital screen inverter **40** Hp as ABB type with bypass contactor **40** Hp as MOELLER type equipped with over /under load, over temperature and all control system needed with all protections rated at suitable power that matches the pump motor with (0.8-1.2) over load range. * Standby capacitor banks with discharge resistors compensating reactor dry type 400v 50 Hz to reach power factor 0.97 Ducati. Three phase capacitor with resistors 15 KVAR Ducati type. * Digital multi meter which is able to read directly from a screen (V, Hz, KW, A, PF). * No voltage phase sequence and phase failure relays of best quality as MOELLER. * On-off push button set and emergency off button. * Reset push buttons red color 22 mm. * Overload relay unit rated at 1-1.5 of motor full load including digital motor screen protection control board. * Temperature relay unit rated at the motor thermal sensor, including digital motor screen protection control board with all cables and connections. * HRC fuses 3\*63A complete Fernaz type. * WHM 50\*50mm. * 24h clock with 150 hr mechanical reserve. * suitable automatic breaker with adjustable thermal and magnetic protection (ISC>=25KA) NZM. * (0-500V) 96\*96mm Voltmeter with selector switch between phases and neutral. * (0-300A) 96\*96mm ammeter. * 3 phase fuse holders set , 10\*38mm , with 20A fuses , * Suitable earth leakage relay class A (AC and Dc trip). * Contactor with discharge 20KVAR Moeller type. * Breakers for service Siemens type. * Relays and timers 24 V for no flow switch and high-pressure, low-pressure sensors. * Three phase 50 Hz 380V (KWh-meter), /5A-200/5 CT’s. The KW-h meter as electromechanical meter or solid state and pre-paid card electric type. * 24V/ 50Hz indication lamps installed in front of the control cabinet.. * 3 position selector switch A-O-M. * 220-2 12V (AC) transformer 100VA. * the price includes all cables to be used for control purposes shall have the following cross section: * \*(3\*35 mm2 + 25 mm2) for the internal connections inside main board and the contractor has to check and order the exact required length. * \*1.5 mm2 for the driving wheel circuits. * \*2.5 mm2 for the circuits of tension measurements. * \*1.5 mm2 for the sensors. * \*4.0 mm2 for the circuits of intensity measurements. * \*All terminals shall be carefully protected to assure electrical insulation. * Switches, measuring instruments, and warning slights shall be installed in the front side of the panel. * The control panel shall be manufactured with enough space (minimum 40% free space of the total size) to insure easy maintenance and no interface between the wiring for all circuits. * All wires must be coded clearly and fixed with special wire heads to avoid loose connection. * All timers (PSK), relays and contactors shall be of best quality as Siemens * All wiring and connection to connect the control panel with the step-up transformer * the contractor shall supply any other materials and devices that might be missed here and considered to be essential to complete the work without claiming any changes in unit prices. * The control panel must be equipped with an alarming bell (100 dB at 8 meters distance) and flashing red alarm (should be visible from 300 meter during day). Alarms for all cases of failure as: voltage drop, no voltage or phase failure high or low pressure and no flow, high temperature etc. * The alarm must be muted without general reset and there should a special button in the front door to stop it alone. * Circuits must consist of the all necessary materials to operate and protect the system automatically and manually, the wiring color system, numbering all the components. The price includes the design of the whole system of control the contractor is intending to carry. The contractor should also submit at the end of work a s built drawing.   The control panel deign should include:   * Transformer 230/24V 100VA * 250 A Breaker for the diesel generator. * Water levels relay HK type. * 220V AC /80 Watt with 2 fans in each compartment, one for taking in air and the other for taking out the air with grid ( for the panel) complete with thermostat protection. * SIREN (alarm system)   Alarm system 24V for :   1. High pressure outlet 2. Low pressure outlet 3. No flow (non return valve) 4. Soft start fault 5. High temperature  * The price includes the excavation works installing pressure switches, flow switch and level sensor and all the electrical parts with suitable conduits and metal ducts to complete the works. * The price includes installing and testing for the mode of operation all mentioned devices and sensors. The control panel must be equipped with earthing unit so the price includes. * **Earthing** : The price of the control panel includes supplying and installing complete earth unit with earth equalizer compressing C40 box copper B.B. 25 mm2, with minimum two concrete manholes as foundation lines , two earth electrodes, D>19m, L=1.5m and any other missing materials to earth the pumping station . The price includes testing earth unit so as to fulfill the standard requirements (resistance less than 1.5-2 ohm). The across different fittings in the piping system. * The price also include supply all materials (as cables, in-out sockets and install, two outlets as 3-phase Service unit for the pumping room including Main MCB 5\*20A -10 KA MOLLER type. MCB 2 \*10A – 10KA Moeller type the control * The price include all cable materials and works to conduct the electrical connections of the thermal sensor inside the motor -(the cable 3x2.5 mm2 , the cable should be of suitable length. Use flexible thermal conduits, cable glands, wire terminals& labeling at both ends and all the accessories needed to complete the work(excavation &backfilling),the cable from the MDB to the head of pump motor.   **Wiring and Lighting the pumping room** Supplying and executing all materials needed for inside and outside lighting of the station (pump shed and station yard) according to the following:   * Supply and install 2x36 W flourcent surface mounted (water proof) IP56 for outside the room. * Lighting the room from inside by three double-glass fluorescent lamps (36 w) in each room (water proof). * 2x30w emergency 10 hours duration lighting fixture to be fixed in accordance with the supervisor engineer's instructions. * The lighting service should be controlled by a separate DGB. Its power source is directly controlled through a double pole MCB. * Lighting the outside of the rooms by External two projectors each of 250W Metal Halide water proof IP 56 with aluminum body (high quality) (the price includes all materials and works to carry the inside and outside wiring and lighting. The projectors, will be switched on from the service DGB. Distribution box for lighting suitable for 24 circuit breaker (DBG). Also the price includes conduits, (3x2.5mm) and all size of cables& all accessories needed to complete the work. Supplying materials and executing 3 intake power sockets, and another one as 3-phase and the other three as 1-phase. The price includes supplying electric cables, leads, on-off keys, power sockets, trenches…etc. The price includes all any other missed works or materials to execute the lightening item. | L.S | 7000 | 1 | 7000 |
|  | Supply and install **submersible electric cable with the following specifications: cable flat, blue color, conductors are solid and made of pure copper, PVC insulated, Armored with inner sheath**,  **600 V, conductors sizes**  3x35+1x16 mm2 (to the pump motor ) + the junction box (WP) and main connection as shown in Annex 2.03. **The cable is fixed to the pipes by stainless steel clamps** each 2 m with soft rubber underneath and pvc ties each meter. | m.l | 15 | 125 | 1875 |
|  | **Flow Control switch**: Supplying and installing an electrical flow switch suitable for 4” pipes, powered by a 24v-dc power source. Price includes all cables and protection conduits required to connect it with the control panel. | Num. | 100 | 1 | 100 |
|  | **Pressure barrel**: Supplying and installing of a pressure barrel. The contractor shall supply and install all the pipes and fittings to connect with outlet main 4” pipes of the pump and should be according to specifications. The price include, complete instrumentation of the pressure barrel including all fittings and steel pipes ½” , and two-1/2 inch ball valves, pressure stabilizer needle valve at the entrance, foot valve-4directions, couples, nibbles, elbows with nuts, bolts, flanges and gaskets as needed to install the pressure barrel. The price includes supplying and installing all necessary materials and works to connect to the pressure switches and casting a suitable reinforced foundation under barrel, and above the pump ground level. | Lump  sum | 500 | 1 | 500 |
|  | **Pressure Control switch** Supply and install two pressure switches 1-25 bar. Price includes all cables and protection conduits required to connect it with the control panel. | Num. | 120 | 2 | 240 |
|  | Supply and install pressure 2” **Relief Valve**, 16 atm, complete, The price includes excavation, cutting, welding, adding screws, bolts and accessories that are needed to assemble the valve and according to specifications Annex 1/ S7 . The Price also include supplying and installing 2" coupling, 2”conical record, 2”nipple and 2" gate valve. | piece | 1200 | 1 | 1200 |
|  | **Pump lifting and reinstallation**: All works related to disjoin the existing discharge head, pumping pipes turbine, shafts, retainers, etc and reinstall the new pumping pipes, turbine, shafts, retainers and all related accessories. The price involves checking and operating the pump after finishing all project works to insure no vibration or unusual sound. | Lump sum | 1500 | 1 | 1500 |
|  | **Supply and install a** multi stage submersible pumping Turbine complete (pump, screen, shaft bowels, stages, connection head to the 5” and 4”pipes, and all related accessories all as specified in the technical specifications attached with the tender. The price includes any other works to achieve the required head and quantity and efficiency.  Current well total well depth is **128** meters; and the existing pump diameter is 6". The existing pumping pipes diameter is **6**"; and the total length inside the well is approx. 108 meters, and dynamic drawdown is not know exactly. Static water level is around 55 meters below surface. The submersible turbine properties is fit as follows   * Liquid water is suitable for field crops and vegetables irrigation and mostly saline. * Design capacity (m3/h): **40** * Design anticipated total head (TDH) (m): Anticipated turbine discharge at TDH at **130 m** * Maximum pump column and discharge head assembly head losses (m): 3 * Shut-off head limits (m):minimum **180m** * Turbine overall efficiency at the intended point is not less than 75% * Minimum bowl efficiency at run out capacity (80 %) * NPSHA at maximum run out capacity (m): 8 * NPSHA at maximum anticipated TDH (m): 5 * Motor and pump operating speed (rpm): 2,900 * Non-overloaded motor. * Max. Pump and motor diameter (in): **8”** * Stainless steel column, stainless steel screen filter * Column pipe and discharge head diameter (in): **5”** * Stainless steel Original (not local) Shroud on the motor to direct the water inlet to the pump as to pass from underneath the motor to the pump. * Closed impellers manufactured from bronze and cast iron bowels. * the well pump shall be capable to run at shut off head for a few minutes * The electrical motor must be supplied with RTD (PT 100) temperature protection. The type of motor connection must be suitable to present the motor temperature digitally. The price include all wiring, PT cables and connections and works required to connect the motor inside the well and the main control panel with relay and off-alarm * Contractor has to connect the motor to the flat cables and control panel upon his responsibility. * The motor shall be designed and built for 24-hours continuous service at any and all points within the required range of operation without overheating, cavitations excessive vibration and strain. * Motor has to be new and furnished with a stainless steel name plate with data of the serial no., speed, Kw, input voltage, full load, Hz, power etc.) and motor must be 1.25 larger than Pump brake horse power or 1.15 larger than the total Input Horsepower to the Electrical Motor. * The motor shall be furnished with a removable water block lead assembly to prevent ingress of water and a sand slinger shall be installed where the shaft inters the stator. * The motor shall be filled at the factory with a treated glycol water internal lubricating solution for a maximum reliability and long life. * All works from supplying, installing connecting running and testing are under the contractor's expenses. * All works must be according to the Palestinian standards and engineer’s instructions and the specification and drawings. * The price also includes any missing works not mentioned to execute this work. * The contractor must submit the motor specifications, certificate of origin, catalogues and on site testing report which shows that the motor is matching with the manufacturer specifications. * The well pump shall be capable to run at shutoff head for a few minutes without mechanical problems. * The turbine torque design should be duty inverter at speed range the design torque values between 1:10 * The price includes supplying and installing all required flanges, coupling, reducers, bolts, spacers, sleeves, nuts, etc. to connect between the turbine outlet, turbine column and the rising pipes and shafts accordingly. The price also includes casting concrete foundation and I steel sections to hold the turbine. The price includes all repair works as a result of old turbine disjoin or new turbine installation. * The contractor shall do in site testing the turbine in accordance with the performance curve and submitting the test report. Before installing any new materials, the contractor must get the initial records for existing conditions of the well including: the well pumping capacity in m3/hr, water level inside the (dynamic and static). Therefore, the contractor must prepare suitable water meter and water level meter to carry on these measures. Therefore, the price of the turbine includes the costs of all these tests. In case the contractor failed to get these measurements, the turbine price will be less by 30% than the price proposed in his tender. | Lump sum | 13000 | 1 | 13000 |
|  | **Pumping pipes**: Supply and install new seamless iron pumping pipes with the following specifications should be supplied: (SCH 40) Diameter 5", thickness not less than 7.1 mm; and teeth not less than 8 teeth in 1" and painted with epoxy from outside and inside or galvanized by factory from source of supply. The number of teeth should be enough to cover the whole length of the intended coupling and not less than 15 cm length. The price includes threading cutting and adding reducers, or flanges, bolts to connect between the new rising pipes and the pump. Taking in consideration that the quantity estimated in this tender may increase or decrease. | M.L | 110 | 114 | 12540 |
|  | **Discharge head:** Supply and assemble a new steel plate as discharge head complete: the intake and outlet dimensions are 5"\*4" with a steel plate 90\*90 with a minimum 50 mm thickness. It includes 3 openings and each of steel column 15 cm height and 2 inches diameter and 4 mm thickness. The price include all works and materials necessary to fix the pumping pipes to the discharge head including excavations, casting reinforced concrete and in installing two I beams to support the discharge head and the pumping pipes. The price includes casting reinforced concrete B300 floor around the discharge head 15 cm thick 2\*2m (using mesh steel bars diameter 10 mm each 20 cm in both direction||) The contractor should calculate the onsite dimensions to decide the exact elevation of the discharge to avoid in water leakage from the surrounding to inside the well hole. | Lump sum | 1500 | 1 | 1500 |
|  | **Accesses Pipes**: **PVC, polyvinyl chloride sch. 80 pipes NP 25 bars of 1.0 Inches Diam.**  Supply, install and test in the well access PVC, pipes sch. 80/1.0 " size threaded and suitable coupling at joints ,These pipes should fixed to the pumping pipes using stainless steel clamps.  The price includes suitable couplings and 2\*2.5 mm2 level submersible cable (>=130 meter) and electrode to test the water level. The control panel must equipped to connect this electrode. | M.L | 8 | 114 | 912 |
|  | **Gate valve**: Supply and assemble gate valve, 4”complete, 16 bar. Price includes excavation, cutting, welding, adding screws, bolts and accessories that are needed to assemble the valve. The valves could be installed anywhere within the project area and according to specifications. mentioned in Annex1, S2 . | Num. | 500 | 2 | 1000 |
|  | **Gate valve**: Supply and assemble gate valve, 3"complete, 16 bar. Price includes excavation, cutting, welding, adding screws, bolts and accessories that are needed to assemble the valve. The valves could be installed anywhere within the project area and according to specifications. mentioned in Annex1, S2 . | Num. | 300 | 1 | 400 |
|  | **Gate valve**: Supply and assemble gate valve, 2"complete, 16 bar. Price includes excavation, cutting, welding, adding screws, bolts and accessories that are needed to assemble the valve. The valves could be installed anywhere within the project area and according to specifications. mentioned in Annex1, S2 . | Num. | 150 | 1 | 150 |
|  | **Non return valve**: Supply and assemble a non return valve, 4” complete, 16 bar of the swing type .Price includes excavation, cutting, welding, adding screws, bolts and accessories that are needed to assemble the valve. The valves could be installed anywhere within the project area according to specifications mentioned in Annex 1/ S1. | Num. | 1200 | 1 | 1200 |
|  | **Compound air valve**: Supply and assemble 2" compound air valve complete, 16 bar. The price includes excavation, cutting, welding, adding screws, bolts and accessories that are needed to assemble the valve. The valves could be installed according to specifications mentioned in Annex 1, S3. The Price also include supplying and installing 2" coupling, nipple and 2" gate valve. . | Num. | 700 | 1 | 700 |
|  | **Pressure gauge**: Supply and assemble pressure gauge, 25 bar with oil liquid Rotal ASME, B40. Price includes excavation, cutting, welding, adding coupling, and accessories that are needed to assemble the gauge. | Num. | 50 | 3 | 150 |
|  | **Dresser:** Supply and assemble 4” dresser complete. Price includes ears 60 cm rods and screws, bolts, excavation, cutting, welding, and adding accessories that are needed to assemble the dresser with NP 16 bar. | Num. | 100 | 2 | 200 |
|  | **Dresser:** Supply and assemble 3" dresser complete. Price includes ears 60 cm rods and screws, bolts, excavation, cutting, welding, and adding accessories that are needed to assemble the dresser with NP 16 bar. | Num. | 100 | 2 | 200 |
|  | **Dresser conical record:** Supply and assemble 2" conical record complete. Price includes r excavation, cutting, welding, and adding accessories that are needed to assemble the dresser with NP 16 bar. | Num. | 70 | 1 | 70 |
|  | **Steel pipes**: Supply and install 4” steel pipes for irrigation network. The minimum thickness of pipes is 4 mm as shown in Annex 1 /S9. The price includes, all costs of transportation, pipes distribution, excavation, cutting, shaping, welding, painting two faces (red oxide priming paint and zinc oxide base oil paint). The price includes reconnecting the new installed pipes with old network pipes and adding new connections (2", 3" or 4") of similar sizes for all farms which exist on the old pipe line. | M.L | 100 | 20 | 2000 |
|  | **Galvanized 3” pipes**  Supply and install 3” diameter galvanized steel pipes thickness 3.96 mm, and according to specifications Annex 1/ S1-9. | M.L | 15 | 12 | 180 |
|  | **Galvanized 2” pipes**  Supply and install 2” diameter galvanized steel pipes thickness 3.96 mm, and according to specifications Annex 1/ S1-9. | M.L | 12 | 6 | 72 |
|  | **Elbows, T or Saddle:** Supply and install 4”/90 or 45 degree black steel elbows or T and Saddle for welding SCH 40 anywhere within the project area | Num. | 40 | 5 | 200 |
|  | Supply and install a complete 4” **cast iron water mete**r according to ISO 4064 (class B) or equivalent annex 1/ S5. Capacity 200 m³/hr, 16 bar painted with epoxy coated from both inside and outside, the measuring unit should be removable type without removing the body Price includes excavation, cutting, welding, adding dresser, flanges, screws, bolts, gaskets and adding accessories that are needed to assemble the valve with the dresser. | Num. | 800 | 1 | 800 |
|  | **Provisional item Supply and install water meter with the following specifications as ABB type :**   * Built-in earthing (grounding) electrode * Diameter 4” PN 16 bars. * Remote communications– including Profibus DP v0 * Electronic Display Unit: Forward, reverse and net totals \_ 4 digital outputs and Communications: serial data (RS232), HART and Profibus DP v0. Remote communication up to 100m length and built in memory 8 GB. Adjustable reading frequency up to 2 s. PLC programmable. * High accuracy as normal between 1-500 m3/hr * Housing IP65 (NEMA4) * Power supply AC/DC | L.S | 3000 | 1 | 3000 |
|  | Supply, install a screen digital hydrostatic level meter (submersible digital level sensor) with the following characteristics:   * Water Level Measurement: 40m (max.) * Excitation: 9 to 30 Vdc, reverse polarity protected * Output: 4 to 20 mA DC, 2 wire, short circuit protected * Input Current: 20 mA max * Accuracy: 0.50% FS BFSL (includes linearity, hysteresis and repeatability) * Response Time: 2 ms * Operating Temperature: -10 to 60°C * Proof Pressure: 150% * Burst Pressure: 200% * Wetted Parts: 316 stainless steel * Electrical Connections: Submersible cable terminating in digital leads   The price include all works and materials, as cables, connections, sensor, digital screen that shows the remaining water depth above the sensor. The price includes all wiring necessary to connect the sensor inside the well’s hole to the MCB. In addition to that a process meter/controller, should be digital and programmable one, with flush mounted to be installed in the MCB 's door, step response 2sec,6A dual relay | L.S | 2500 | 1 | 2500 |
|  | **Provisional item Field and Lab Tests:**   * Water quality test includes Fecal and total Coliform, nitrate, chloride, sodium and bicarbonate, total dissolved solids, Sodium Adsorption ratio. All tests should be done two times, one according to the existing situation and the other one after the project. | L.S | 500 | 1 | 500 |
| **Total costs of all materials and works** | |  | | | **53689** |

**Costs Summary**

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| **Description** | **Total amount /$US** |
| **All Mechanical and Electrical works for the groundwater well. 19-17/024** |  |
| **Total in words (includes) –$US** | |

**Company / Contractor Name: --------------------------------------------**

**Address: -----------------------------------------------------------------**

**Telephone: -------------------------------------- Fax: ---------------------**

**Signature and Stamp: --------------------------------**

**Date: -----------------------------**