ELECTRICAL WORKS

2.0 SCOPE OF WORKS AND GENERAL RULES

2.1 Work Included

The work to be done under this section of work shall include the furnishing of all tools, labor, equipment, fixtures and materials, each complete and in proper working condition unless one or other is specifically excluded or stated otherwise in these Specifications but not limited to the following principal items of work:

2.1.1 Layout of Intermediate Metal Conduits and pullboxes from NAIA Electrical Room to the new PAGASA office with proper hangers and supports.
2.1.2 Installation of Panel Distribution boards at the new PAGASA office with wire gutters.
2.1.3 Installation 50AT, 3P, 230V circuit breaker at the Panel Board of NAIA Electrical room.
2.1.4 Installation of electric feeder wires (Cable pulling) from NAIA Electrical Room to the new PAGASA office.
2.1.5 Disconnection of the existing wiring of lighting and power outlet of the new PAGASA office from the existing power supply of NAIA and install a new wiring system that will be terminated/connected to the new panel distribution board of PAGASA office.
2.1.6 Installation of additional convenience outlet with trunking.
2.1.7 Perform terminations for all electrical system.
2.1.8 Complete the testing of all electrical systems.
2.1.9 Preparation of "As-built" drawings.
2.1.10 If any item of works or material has been omitted which are necessary for the completion of the Electrical Work as outlined herein before, then such items shall be and hereby included in this section of work.

3.0 PROCEDURES

3.1 Workmanship

The ELECTRICAL CONTRACTOR shall execute the work in the most thorough, prompt and workmanlike manner and in accordance with the plans, specifications and standards of Philippine Electrical Code (PEC). The installations shall be done thru standard methods and good engineering practices.

3.2 Materials

All materials to be installed shall be brand new except as otherwise noted on the plans or specifications. The materials shall be as specified. No substitution of materials is allowed. Should the ELECTRICAL CONTRACTOR find it necessary to use another type/brand of materials instead of the specified item, he shall first obtain approval from the PROCURING ENTITY prior to installation. Any substituted material installed without the approval of the PROCURING ENTITY shall be subject to replacement.

3.3 Coordination

It is the sole responsibility of the ELECTRICAL CONTRACTOR to conduct coordination of his activities with the following:

3.3.1 Other trades and suppliers
3.3.2 Procuring Entity/Engineer
3.3.3 PAGASA
3.3.4 NAIA

3.4 Deviation From The Plans

No deviation from the plans is to be made unless given notice or approval by the PROCURING ENTITY.

3.5 Record Drawings and „As-Built" plan.

The ELECTRICAL CONTRACTOR is required to keep an active record of the actual installation during the progress of the job. This shall be the reference in the preparation of the „As-Built‟ plans which shall include all pertinent information, complete in all aspect of the actual installation, and all new information not originally shown in the contract drawings. The „As-Built‟ plans shall be prepared by the ELECTRICAL CONTRACTOR at his expense and shall be submitted to the Procuring Entity for approval upon the completion of the work. The approval of the „As-Built‟ drawings shall be a **pre-requisite for the final acceptance of the electrical works.**

Submit two (2) copies of the "As-Built" drawings signed and dry sealed by the ELECTRICAL CONTRACTOR'S Professional Electrical Engineer. Original tracing/reproduceable copy shall also be submitted to the PROCURING ENTITY.

3.6 Samples & Shop Drawings

3.6.1 30 days prior to the installation or fabrication of materials the ELECTRICAL CONTRACTOR shall submit to Procuring Entity the following for approval.

a. Shop drawings of panel boards showing arrangements of circuit breakers, bus bar sizes, lugs, etc. Indicate all dimensions.
b. Shop drawings or samples required as noted in the drawings.
c. Samples and catalogs of materials intended to be installed.

3.6.2 The ELECTRICAL CONTRACTOR shall also submit to the Procuring Entity without delay shop drawings and other submittals which may be required by Procuring Entity during the progress of construction.

3.6.3 The above requirements shall be submitted to the Procuring Entity at the earliest possible time to give allowance for checking and verification. These shall be complete in all aspects.

3.6.4 Submit two (2) sets of each shop drawings.

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3.7 Electric Power

The ELECTRICAL CONTRACTOR shall be responsible for his own electric power needed for the execution of the job.

3.8 Test

Conduit tests on all electrical conductors installed in the presence of the PROCURING ENTITY's representative.

3.8.1 Insulation resistance test
3.8.2 Continuity test
3.8.3 Check circuit connections at panel boards, all single phase circuit shall be connected to phase as shown in the load schedule.

3.9 Submit Reports on Tests

3.9.1 All reports must be formal, typewritten and properly identified.
3.9.2 All defects found during the test shall be repaired immediately by the ELECTRICAL CONTRACTOR.
3.9.3 All tools, equipment and instruments needed to conduct tests shall be on the account of the CONTRACTOR.

4.0 METHODS & MATERIALS

4.1 Conduits

4.4.1 Intermediate Metal Conduit (IMC)

a. Standard trade sizes
b. Coupling & fittings - standard couplings for joints.

4.4.2 Installation of Conduits

a. Installation is in accordance with PEC and of good engineering practice.
b. Use standard trade sizes locknut and bushing at each end terminating in boxes/panel boards. Ensure electrically continuous conduit system.
c. Provide independent conduits supports using hangers, supports or fastenings spaced in accordance with good engineering practice and PEC.
d. Conduits must be securely fastened with approved cups and screw in wall and in ceiling, nails are not acceptable
e. Conduit threads cut on job shall have same effective lengths, thread dimensions, and taper as factory threads.
f. Cut ends of conduit square with hand or power saw and ream to remove burrs and sharp edges.
g. Clamps shall be galvanized malleable iron one-hole straps, beam clamps or other approved device with necessary bolts and expansion shields.
h. The supply/feeder wires shall be laid out properly from NAIA Electrical Room to the new PAGASA office using the specific conduit and fittings. Submit sample for approval.
i. No wiring shall be exposed.

4.2 Wires

1. Wires shall be annealed copper, 98% or better conductivity, insulated, single, except as noted in the drawings.
2. 600 volt class type as indicated in the plans.
3. Wires greater than no. 8 mm² shall be stranded.
4. Use standard methods in pulling wires.
5. Splices of wires/cables shall be done inside junction boxes or auxiliary gutters using standard connectors. No wires shall be spliced inside conduits.
6. All wires and cables shall be color coded as follows:
   a. For three phase : Line (Black), Ground (Green)

4.2 Connectors

Use solderless mechanical pressure - type lugs, copper

4.3 Insulation

All splices shall be properly insulated using 3M electrical tape. Application of insulation tape shall be equivalent to the insulation of the wire concerned.

4.4 Panel board & Circuit Breaker

4.5.1 NEMA type/enclosure unless noted, PEC rules and regulations, circuit breaker type shall be 230V, number of pole as required.

4.5.2 Panel boards shall contain a single brand of circuit breakers and as manufactured by “Schneider Electric” or “GE”.

4.5.3 All circuit breakers used shall be “Bolt on” type .

SCOPE OF WORKS FOR NAIA ACU INSTALLATION

1. Clearing the area
2. Fabrication of fan coil until base and condenser base 2.5 " x 20 ft. angular bars.
3. Installation of fan coil units and condensers to its corresponding locations.
4. Fabrications of concrete pad for condensers thickness H=5 inches W=10 inches L=1.5 inches 2-sets per air-con pad 4 condensers to be installed and water proofing is also required for all concrete pads together with the bolts and angular bars use in the installation it is also required to X-ray or scanning of concrete slab for tapping of holes for piping lay-out installations.
5. Laying of copper tubing ½" for high pressure pipes and 1.5" dia. For the low pressure pipes and insulate it with corresponding sizes of copper tubing and use polyethylene tapes around it. Laying of PVC pipe 1.5" dia. To be tapped at Muslim Prayer room concrete walling for the tapping point condenser.
6. When laying of copper tubes under ceiling (use 10mm x 8ft) Full threaded rod and expansion shield with U-bolt for copper tubes hangers 2.5" x ¼" diameter.
7. Vacuuming and flood testing add additional R-410 A to the system.
8. Testing and turn-over together with its warranty certificate.
9. Cleaning the area.

Note: Consumables and all mechanical and work permits shall be shouldered by winning bidder.

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