SECTION 409100 - PRIMARY PROCESS MANAGEMENT DEVICES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Furnish Primary Process Measurement Devices throughout the facility as defined within this specification and the sections listed below.

1. 01 33 00 Submittals
2. 01 78 00 Operation and Maintenance Data
3. 01 91 13 Equipment Testing and Startup
4. 40 41 95 Process Control Description & Operation
5. 40 96 15 I/O List

1.2 REFERENCES

A. The organizations and standards listed below form a part of this specification to the extent that all equipment and labor services provided shall conform to their corresponding reference.

1. IEEE-Institute of Electrical and Electronic Engineering
2. ISA-Instrumentation Society of America
3. ANSI-American National Standards Institute
4. JIC-Joint Industrial Council
5. OSHA-Occupational Safety and Health Act
6. NEC-National Electrical Code
7. UL-Underwriter Laboratories

1.3 SUBMITTAL

A. Refer to Section 01 33 00 Submittals. In addition, the following Submittals and Requirements shall be considered part of the contract documents.

B. General Requirements

1. Submit, within 45 calendar days after Notice to Proceed, the following with regard to Primary Process Measurement Devices:

    a. Product Data: Manufacturer's descriptive and technical literature with all model numbers and related data highlighted.
    b. Specification Sheets, performance charts and installation instructions.
    c. Product specific catalog cuts shall be in booklet form, indexed to the unique identifiers, and shall consist of Specification Sheets that document compliance with the specification. Where multiple components are shown on a catalog cut, the application specific component shall be marked in a clear fashion.

2. Operation and Maintenance Data

a. Reference to Section 01 78 00 for specific Operations and Maintenance Data.

3. Equipment Testing and Startup

a. Refer to Section 01 91 13 for specific Equipment Testing and Startup requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. All instrumentation and electronic equipment shall be of the manufacturer's latest design, utilizing printed circuitry and epoxy or equal coating to prevent contamination by dust, moisture and fungus. The field mounted equipment and system components shall be designed for installation in dusty, humid and slightly corrosive service conditions.

B. All instruments shall be provided with mounting hardware and floor stands, wall brackets, or instrument racks unless otherwise noted. Fasteners for securing control panels and enclosures to walls and floors shall be either hot-dipped galvanized after fabrication or stainless steel. Provide stainless steel fasteners only in corrosive areas rated NEMA 4X. Provide minimum size anchor of 3/8-inch.

C. All indicators shall be linear in process units, unless otherwise noted. All transmitters shall be provided with indicators in process units, accurate to two percent or better.

D. All equipment, cabinets and devices furnished shall be heavy-duty type, designed for continuous industrial service. The system shall contain similar products of a single manufacturer, and shall consist of equipment models, which are currently in production. All equipment provided shall be of modular construction and shall be capable of field expansion.

E. All analog transmitter and controller outputs shall be 4-20 mA into a load of 0 to 750 ohms, unless specifically noted otherwise.

F. All equipment shall be designed and constructed so that in the event of a power interruption, the equipment specified hereunder shall incorporate a mechanism to resume normal operation when power is restored, without the need for a manual reset.

G. All Instrument Datasheets and Instrument panel drawings have been provided as a reference only. It is the final responsibility of the CONTRACTOR to review all documents and ensure selected equipment and instrumentation is suitable for its intended use. Alternate equipment will be considered during the final Submittal process and review by the Engineer.

H. Nomenclature and Identification

1. All field instrumentation shall have an attached stainless-steel tag indicating instrument tag number. (Example: FIT-100).

I. Electrical

1. Equipment shall operate on a 60 Hertz alternating current power source at either a nominal 480 volts or 120 volts AC, plus or minus 10 percent, except where specifically noted. Regulators and

power supplies required for compliance with the above shall be provided between power supply and interconnected instrument loop. Where equipment requires voltage regulation, constant voltage transformers shall be supplied.

2. With the exception for field device network connected devices, all electronic instrumentation shall utilize linear transmission signals of isolated 4 to 20 mA DC (milliampere direct current) capable of driving a load up to 750 ohms, unless specified otherwise. However, signals between instruments within the same panel or cabinet may be 1-5 VDC (volts direct current). All field instrumentation shall be HART compatible where available.
3. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission. No zero-based signals will be allowed.
4. All switches shall have double-pole, double-throw contacts rated at a minimum of 600 VA where available.
5. Switches and/or signals indicating an alarm, failure or upset condition shall be wired in a fail-safe manner. A fail-safe condition is an open circuit when in an alarm state.
6. Materials and equipment shall be UL approved whenever such approved equipment and materials are available.

2.2 ELECTRICAL SURGE PROTECTION

A. Provide Surge protection of all 120 VAC power feeds into control panels, instruments, and control room equipment to protect downstream equipment from induced surges caused by lightning, utility surges or the plant electrical system.

B. Non-Fiber Based Data Highway or Communications Circuits – Provide protection on all communication and data highway circuits that leave a building or are routed external to a building. Circuit protection shall be provided at both ends of the line.

C. Inductive Loads – Provide coil surge suppression devices, such as varistors or interposing relays, on all process controller outputs or switches rated 120 VA or less that drive solenoid, coil, or motor loads.

2.3 SPARE PARTS

A. Provide instrumentation as specified on the instrument data sheets.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Instrumentation and accessory equipment shall be installed in accordance with manufacturer installation instructions. This includes local wiring, connections to process pipe, and other accessories required for the instrumentation and controls to safely and accurately operate. If provided as part of the reference documents, all indicated locations of equipment, transmitters, alarms and similar devices indicated are approximate only. Exact locations of all devices shall be as approved by the Engineer during construction. Obtain in the field, all information relevant to the placing of process control equipment and in case of interference with other work, proceed as directed by the Engineer and furnish all labor and materials necessary to complete the work in an approved manner at no additional cost to the Owner.

B. Provide brackets and hangers required for mounting of equipment.

C. The shield on each process instrumentation cable shall be continuous from source to destination and be grounded at only one ground point for each shield.

D. Investigate each space in the building through which equipment must pass to reach its final location. If necessary, ship material in sections sized to permit passing through restricted areas in the building. Provide on-site service to oversee the installation, the placing and location of system components, their connections to the process equipment panels, cabinets and devices, subject to the Engineer's approval. Certify that field wiring associated with the equipment is installed in accordance with best industry practice.

E. Provide sunshades for equipment mounted outdoors in direct sunlight. Sunshades shall include standoffs to allow air circulation around the cabinet. Orient equipment outdoors to face to the North or as required to minimize the impact of glare and ultraviolet exposure on digital readouts.

END OF SECTION