# SECTION 405020 INSTRUMENTATION EQUIPMENT

## PART 1 - GENERAL

### A. Designations of Components

In these specifications and on the plans, all systems, meters, instruments, and other elements are represented schematically and are designated by numbers, as derived from criteria in ISA standards. The nomenclature and numbers designated herein and on the plans shall be employed exclusively throughout shop drawings, data sheets, and the like. Any other symbols, designations, and nomenclature unique to a manufacturer's standard methods shall not replace those prescribed above, as used herein, and on the plans.

### B. Signal Characteristics

Wherever possible and feasible, components shall be of electronic solid-state design and systems shall utilize the same signal characteristics throughout each and all of the several systems; transmission signals shall be 4 mA to 20 mA. The combined power supply and transmitter loops shall, when tested with appropriate precision resistors, present a voltage signal of 1- to 5-volt DC. Signal isolators shall be provided where required.

## PART 2 - MATERIALS

### A. Pressure Transmitter

1. The pressure transmitter shall be of the microprocessor-based type 2-wire system. The transmitter shall operate from a 24 V dc source. The output signal shall be 4 mA to 20 mA dc. The transmitter shall be housed in a NEMA 4 enclosure.

2. Configuration data shall be stored in nonvolatile EEPROM memory in the transmitter electronics module. This data shall be retained in the transmitter when power is interrupted, so the transmitter shall be functional immediately upon power up. The transmitter shall perform continuous self-tests. In the event of a problem, the transmitter shall activate the user-selected analog output warning. A HART Communicator or other HART-based communications device shall be able to interrogate the transmitter to determine the problem. The transmitter shall output specific information to the communicator identifying the problem for fast and easy corrective action.

3. The pressure transmitter shall provide an electronic signal proportional to the calibrated pressure range. The pressure-sensing element shall be silicone oil filled with a process media operating temperature range of -40 °F to 250 °F. An integral stainless steel block/bleed manifold (pre-assembled to the transmitter and leak checked) shall be provided for each transmitter. The manifold shall have a block and a vent/test valves.

4. Provide the pressure transmitter with the following features:

   a. Independent external zero and span adjustments.

   b. Overrange protection.

   c. Integral digital indicator, calibrated in engineering units.

5. Accuracy of the pressure transmitter shall be ±0.1% of calibrated span.

6. The pressure transmitter shall be manufactured by Rosemount, Model 2088 with Model 306RT1 Block-and-Bleed Manifold.

| PRESSURE TRANSMITTER | | | |
|---|---|---|---|
| | GENERAL | | |
| 1. | Tag No. | PIT-111 | PIT-115 |
| 2. | P&ID No. | N-102 | N-102 |
| 3. | Service | Inlet Pressure | Outlet Pressure |
| 4. | Type | Strain Gage | Strain Gage |
| 5. | Function | Transmit Pressure | Transmit Pressure |
| | | | |
| | ELEMENT | | |
| 6. | Element Material | 316 SST | 316 SST |
| 7. | Body Material Mfg. | Std. | Std. |
| 8. | Connection Size | 1/2-inch NPT | 1/2-inch NPT |
| | | | |
| | TRANSMITTER | | |
| 9. | Location | Inlet Pipe | Outlet Pipe |
| 10. | Mounting | 2" Pipe Stand | 2" Pipe Stand |
| 11. | Area Class | NEMA 4 | NEMA 4 |
| 12. | Calibration | 0-120 psi | 0-120 psi |
| 13. | Output | 4 mA - 20 mA dc | 4 mA - 20 mA dc |
| 14. | Indication | Yes | Yes |
| 15. | Output to | PLC | PLC |
| 16. | Power | 24 V dc | 24 V dc |
| 17. | Install. Detail | Dwg. N-502 Det. 3 | Dwg. N-502 Det. 3 |

B. Flood Level Switch, Float Type

1. The switch shall be float-actuated type with contact ratings not less than 100 mA at 120-volt ac. Housing shall be watertight construction with non-corrosive materials for wetted components. Float actuator shall be enclosed in an envelope to provide slosh shielding.

2. The flood level switch shall be Gems Model LS-270, or equal.

| FLOOD LEVEL SWITCH | | |
|---|---|---|
| | GENERAL | |
| 1. | Tag No. | LSH-107, LSH-119 |
| 2. | P&ID No. | N-102 |
| 3. | Service | Meter Vault, Valve Vault |
| 4. | Type | Float |
| 5. | Function | Detect Vaults Flooding |

C. Hatch Switches

1. Provide a heavy-duty, precision turret-head type limits switch with two normally open contacts along with an adjustable lever arm with oil-impregnated sintered iron roller.

2. The switches shall be interfaced with PLCs.

3. Mount switch on access hatch inside the frame such that when the hatch is at least 15° opened, the normally open switch contact shall close; and when the hatch is closed, the normally open switch contacts shall open.

4. Provide a Square D, Class 9007, Type C switch, or equal.

5. The following switches are required: ZS-103 and ZS-117.

C. Current-to-Current Converter / Splitter

1. Provide current-to-current converters (isolators) where required. The converter shall operate on a 120-volt, 60-Hz power source. Both input and output signals shall be analog 4 mA to 20 mA.

2. Analog signal splitter module shall accept a 4 mA – 20 mA signal and output two (2) 4 mA – 20 mA signals. Module shall provide electrical isolation between the input, outputs, and power supply.

3. The unit shall have the following features:

   a. Accuracy: ±0.25 percent of span, or better.

b. Input Impedance: 50 Ω maximum.

c. Output: 4 mA - 20 mA DC for load impedance 0 Ω to 800 Ω for 24VDC power supply.

d. Adjustments: Span and zero; multi-turn or menu-driven.

D. Pulse Splitter

1. Provide pulse splitter where required. The splitter shall have a single pulse input and two (2) pulse outputs.

2. The splitter shall be able to interface with open collector transistor output of a magmeter.

3. Splitter shall be Mod. PLS257 by APCS, distributed by Absolute Process Instruments, Inc. (http://www.api-usa.com/), or equal.

END OF SECTION