

ELECTROMAGNETIC FLOWMETER (MAG METER)

PART 1: GENERAL

1.1 SCOPE

- A. The City of Winter Haven is looking to purchase an 18" electromagnetic flow meter. The meter should be a Siemens Mag Meter 5100 W with a Siemens Magflo 5000 Converter/Transmitter or equivalent as determined by the City.

- B. The bidder shall furnish the Mag meter equipment and accessories as specified herein.

1.2 SUBMITTALS

- A. The following information shall be included in the bid:
 - 1. Data sheets and catalog literature for the Mag meter and the microprocessor based converter/transmitter.
 - 2. Connection diagrams for equipment wiring.
 - 3. List of spare parts and optional equipment.

PART 2: PRODUCTS

2.1 ELECTROMAGNETIC FLOWMETER

- A. The electromagnetic flow meter shall consist of a flow sensor based on Faraday's law of electromagnetic induction and microprocessor based signal converter/transmitter, type MAGFLO 5100W or equivalent as determined by the City .
- B. Sensor:
 - 1. Operating principle: Utilizing Faraday's law, the sensor converts the liquid flow through the sensor into electrical voltage proportional to the velocity of the flow.
 - 2. Construction: The sensor flow tube shall be built of 304 stainless steel pipe, 2 coils mounted on the outside of the flow tube, 316 stainless steel electrodes, 316 stainless steel grounding electrodes, elastomer liner and carbon steel connecting flanges.
 - 3. Installation: A minimum of 5 pipe diameters up stream and 3 pipe diameters down stream are recommended. (Consult the factory for any variations.)
 - 4. Operating Temp: -20 to 200° F.
 - 5. Size: 18" diameter (see instrument schedule)
 - 6. Submergence: The sensor shall be pedestal sealed against accidental submersible to 10 feet for 72 hours standard and permanently submerged to 30 feet indefinitely when the terminal box is backfilled with a non-setting, transparent potting material.
- C. Converter/Transmitter: Type MAGFLO 5000 or equivalent as determined by the City.
 - 1. Enclosure: NEMA 4X enclosure
 - 2. Display: Background illuminated alphanumeric 3 line, 20 character display to indicate flowrate, totalized values, settings and faults and 6-key

- keypad. (A blind transmitter version of the 5000 is available)
- 3. Power supply: 115/230 VAC or 11-24VDC.
- 4. Operating temp: -5 to 120 degrees F.
- 5. Output: 0-20mA or 4-20mA into 800 ohms max. 1 relay rated at 42VAC/2A, 24DC/1A.
- 6. Communications: Optional HART available.
- D. Sensor and converter/transmitter performance:
 - 1. Flow Range: 1.5 fps to 33 fps for accuracies stated below.
 - 2. Accuracy: 0.50% of actual.
 - 3. Separation: Maximum distance of 900 feet between converter and sensor without the use of any additional equipment.
 - 4. Bi-directional flow capabilities shall be standard
- E. Totalizer:
 - 1. Two eight digit counters for forward, net or reverse flow
- F. The electromagnetic flow meter shall be a Siemens Model 5100W flow sensor with a Siemens Model MAGFLO 5000 signal converter or equivalent as determined by the City. Insertion type flow meters will not be accepted.

2.2 SPARE PARTS

- A. Spare parts for the equipment shall include the following, unless noted otherwise:
 - 1. Successful bidder is to provide 2 complete sets of operation manuals.

PART 3: OPERATOR FUNCTIONS

3.1 CALIBRATION

- A. Each flow sensor shall be wet calibrated and all of the calibration information and factory settings matching the sensor shall be stored in an integral mounted SENSORPROM® memory unit. The SENSORPROM® shall store sensor calibration data and signal converter settings for the lifetime of the product. At initial commissioning, the flowmeter commences measurement without any initial programming. Any customer specified settings can be downloaded to the SENSORPROM® by the customer in the field. Should the signal converter need to be replaced, the new converter will be plug-n-play and upload all previous settings from SENSORPROM® and resume measurement without any need for reprogramming or rewiring in any way.
- B. A certificate of calibration shall accompany each flow sensor.

3.2 CONVERTER/TRANSMITTER FUNCTION DETAILS

The following functions shall be provided:

- A. All programming shall be accomplished through an integral key pad and all programming shall be protected by a user-defined password.
- B. The converter/transmitter shall be remotely mounted. A remote mount kit will be provided by the manufacturer.
- C. The converter/transmitter shall provide a 0-20 or 4-20 mADC signal proportional to flow into 850 ohms max. Output will be selectable as unidirectional or bi-directional.

- D. The relay shall be programmable as error indicator, limit alarm or pulsed output.
- E. The converter system shall be equipped with an error and status log with 4 groups of information.
 - 1. Information without a functional error involved.
 - 2. Warnings which may cause malfunction in the application
 - 3. Permanent errors, which may cause malfunction in the application.
 - 4. Fatal error, which is essential for the operation of the flowmeter.
- F. A system error shall be indicated by a flashing Icon on the display or activation of the relay when set as an error alarm.
- G. The first nine standing errors shall be stored in the error pending log. A corrected error is removed from the error pending log. A status log shall be provided to store the last 9 error messages received for 180 days regardless of correction.

PART 4: REVERIFICATION

4.1 VERIFICATION PROCEDURE

- A. Verification using a stand-alone Siemens MAGFLO Verificator or equivalent to measure a number of selected parameters in the flow sensor and signal converter, which affects the integrity of the flow measurement, shall be available through a factory re-verification service.

4.2 VERIFICATION PARAMETERS

- A. Verification of the Flowmeter shall consist of the following test routines:
 - 1. Insulation test of the entire flowmeter system and cables.
 - 2. Test of sensor magnetic properties (optional)
 - 3. Signal converter gain, linearity and zero point tests.
 - 4. Digital output test.
 - 5. Analog output test.

4.3 VERIFICATION CERTIFICATE

- A. A certificate of verification shall be issued if the flow meter passes all of the tests with-in 1% of the original factory test parameters.

PART 5: MANUFACTURER'S ASSISTANCE

5.1 WARRANTY

- A. The manufacturer of the electromagnetic flow meter shall guarantee for one year of operation that the equipment shall be free from defects in design, workmanship, or materials.
- B. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the manufacturer shall promptly replace the defective part at no cost to the owner.