

MAG Meter Sample Specification

Type: Electromagnetic Flow Meters

Scope:

This Specification covers electromagnetic flow meters compatible with battery powered displays/registers or mains power capable of utilizing open architecture radio read equipment, in sizes 3" through 48". The preferred meter shall be a Hersey HbMAG or equivalent.

AWWA Standards:

- The AWWA standard for electronic revenue meters of this type is currently being reviewed and is still in subcommittee. The items below should be referenced as soon as the standard is published.
- All Meters shall meet or exceed the latest version of the American Water Works Association Standard C7-- for Electronic Revenue Meters when it is published.
- All Meters shall meet or exceed the American Water Works Association Standard C7-- for Electronic-Type Remote-Registration systems for Water Meters when equipped with an open architecture radio MIU.

Other Standards:

- All Meters shall meet or exceed the latest NSF-61 requirements for lead and contaminants.
- All Meters shall be compliant with the latest EPA requirements which take effect on January 4th, 2014.
- Meters in 3" through 12" sizes shall be available in an FM Approved variant when required for fire service.

Measuring Technology:

- Measuring technology shall be electromagnetic in nature utilizing Faraday's Law of Induction to determine all flow data. The meter shall be either battery powered or mains powered with battery backup and a microprocessor based signal converter as specified by the customer.
- Operating principle: Utilizing Faraday's Law of Electromagnetic Induction, the flow of conductive liquid through the sensor induces an electrical voltage that is proportional to the velocity of the flow.
- The electromagnetic flow meter shall be a Hersey HbMAG or equivalent. Insertion type flow meters will not be accepted.

Main Case, Tube and Sensor:

- Outer main case shall be composed of epoxy coated carbon steel with welded flanges.

- The sensor shall utilize a SST tube inside an epoxy coated outer carbon steel case with welded steel flanges
- The sensor flow tube shall be constructed of an EPDM liner surrounded by two integral coils.
- All internal components shall be encased in a waterproof compound.
- The meter serial number, part number, size and description shall be affixed to the display/register housing of the meter with a permanent label.
- Measurement and grounding electrodes shall be Hastelloy C-276
- Construction: The sensor flow tube and liner material shall be constructed of EPDM surrounded by two integral coils. Measurement and grounding electrodes shall be Hastelloy-C276. Connecting flanges and sensor enclosure shall be epoxy-painted carbon steel. All internal components shall be encased in a waterproof compound.
- Installation: A minimum of 5 pipe diameters up stream and 3 pipe diameters downstream of straight pipe the same nominal size of the meter are recommended. (Consult Mueller Systems for any variations)
- Media Temperature: 32 to +158° F.
- Size: 3” to 48” diameter
- Enclosure rating: NEMA 6P

Headloss:

- No mechanical measuring element component may extend into the measuring tube which increases pressure loss.
- No strainers shall be used or required for proper operation of the meter. Strainers increase pressure lose and are not desirable
- I the event a strainer is used, acceptable installation is a minimum of 5 inlet pipe diameters downstream of the meter

Accuracy:

- Meters shall be 100% factory tested for accuracy and have the factory test results provided with each meter.
- Meters shall be pressure tested to ensure against leakage.
- Meters shall comply with the most current AWWA C7-- accuracy requirements as soon as the specification is published.

Signal Convertor or Display/Register Assembly

- Displays/Registers shall have Hersey/Sensus encoder protocol output as the standard output. In lieu of the encoder output, a dual pulse output is available for communication with SCADA, BMS, and BAS systems.

- Displays/Registers shall be battery powered with an LCD display or mains powered with battery backup as required.
- Two battery options shall be offered; a 10 year external battery pack shall be preferred. A 6 year integral battery shall also be offered as an alternate.
- Both battery options must be easily field replaced with common service tools and not require special tools or hardware.
- Contain two eight-digit counters for forward or reverse flow.
- The display/register shall provide for visual registration of forward net total, rate of flow, backflow total, have a resettable counter and diagnostic icons at the meter.
- The numerals on the number wheels of the display/register shall be a minimum of 1/4" in height and should be legible at a 45-degree angle.
- The display/register shall be secured to the meter main case (or remotely located up to 33' away per the customer's request) by SST screws which can be sealed with a suitable seal wire by the customer for tamper protection.
- For all installations, the solid state display/register shall be permanently factory sealed with an epoxy coating of all wire terminal connections. Displays/Registers requiring field sealing of the wire connection will not be allowed.
- All wiring for radio MIU's in line connectors shall be installed and potted to the Display/Register by the manufacturer. A choice of a 25' Nicor connector or a 25' Itron connector shall be offered on all meters.
- In line waterproof connections are permitted for meter connection to Radio MIU's to facilitate installation and field analysis of operation. 25' Nicor and Itron in line connections are approved to be used.
- At a minimum, the meter should be compatible with the Hersey Hot Rod Mobile AMR system and the Mi.Net AMI fixed network system or equivalent.
- Display/Register Location: Integral on sensor/meter body, or remote as required with watertight connections
- Remote Display/Register Distance: 33'
- Display: LCD showing flow rate, totalized values, service menu, resettable totalizer and alarm.
- Power supply: Replaceable internal or external battery or mains powered with battery backup as specified by customer.
- Operating temperature: -4 to +140 degrees F.
- Outputs: two (2) configurable passive pulse are available as an alternative to the encoder output
- The meter serial number, part number, size and description shall be affixed to the display/register housing of the meter with a permanent label.

Sensor and Signal Converter Performance

- Accuracy: 0.4% +/- 2mm/sec of actual flow.
- Normal Flows: +/- 0.4%
- Low Flow: 95% minimum
- Bi-directional flow capabilities shall be standard

Totalizer Display/Register

- Two eight-digit counters for forward or reverse flow.

Calibration

- Each flow sensor shall be wet calibrated by an accredited flow lab with traceable instruments referring directly to the physical unit of measure according to the International System of Units. The calibration certificate ensures recognition of the test results worldwide including the U.S. with NIST traceability.
- The calibration information shall be stored internally in the Display/Register signal converter for the lifetime of the product.
- A certificate of calibration shall accompany each flow sensor.
- Additional field calibration shall not be required as part of the general installation process. The meter shall be plug and play without the need for any field set up or programming..

Signal Converter or Display/Register Functionality

- The following functions shall be provided:
- All programming shall be done at the factory without the need for any field programming.
- The signal converter shall either be integrally mounted or remotely mounted as specified by the customer.
- The signal converter system shall be equipped with an error and status log.
- A system error shall be indicated by an icon on the display or activation of the output pulse when set as an error alarm.
- The signal converter shall provide a data logger of 26 records: selectable as daily, weekly or monthly logging period and available at the display at any time.
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Installation

- Follow manufacturer's recommendation for the minimum upstream (5X) and downstream (3X) installation requirements of straight pipe in the same nominal size as the flow sensor.
- In the event no straight pipe lengths are available before or after the meter, installation is still a viable option with a verified accuracy of + or – 2% permitting installation in cramped and tight environments.
- Wiring between flow sensors and remote mounted signal converters shall use cable type and procedures as per the manufacturer's recommendation.
- Connection of integral grounding straps is required in all applications.
- The use of grounding rings is required per the installation instructions when Cathodic protected, lined or plastic pipe is used

Warranty

- The manufacturer of the electromagnetic flow meter shall provide a one year warranty that the equipment shall be free from defects in design, workmanship, or materials.