

***National Type Evaluation Program***  
***Certificate of Conformance***  
***for Weighing and Measuring Devices***

**For:**

Stationary Wholesale Meter  
Magnetic Inductive Flowmeter  
Meter Models: LCMAG, HMSXX00 or  
ISOMAG, MSXX00 Series;  
Sizes X32, X40, X50, X65, X80 or X100  
Flow Rates: See Page 2  
Signal Converter Series: HML200 and ML200 (non-  
metrological suffixes may be added)

**Submitted by:**

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**Standard Features and Options**

Specific flow rates covered by this Certificate are listed on Page 2.

- Pulse, digital and analog outputs
- 8 line x 16 character, graphic LCD display
- RS 485 serial interface
- PTFE (Teflon) liners ("T" before size; i.e., T32 size)
- Flanged connections (HMS2500 Series)
- 232 psi working pressure
- 316 stainless steel electrodes
- Minimum conductivity of 5  $\mu\text{S}/\text{cm}$

**Options:**

- RS 232 serial interface
- Polypropylene ("P" before size; i.e., P32 size) or Ebonite (hard rubber) ("E" before size; i.e., E32 size) liners
- Wafer connections (HMS1000 Series)
- Sanitary connections (HMS2400 Series)
- Working pressure up to 750 psi
- Hastelloy, titanium, tantalum or platinum electrodes
- Resettable counter series 8162XX

This device was evaluated under the National Type Evaluation Program (NTEP) and was found to comply with the applicable technical requirements of Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages.

Effective Date: March 15, 2000

Henry V. Oppermann  
Chief, Office of Weights and Measures  
Issue Date: June 8, 2000

**Note:** The National Institute of Standards and Technology does not "approve," "recommend," or "endorse" any proprietary product or material, either as a single item or as a class or group. Results shall not be used in advertising or sales promotion to indicate explicit or implicit endorsement of the product by the Institute. (See NTEP Policy and Procedures.)

**Liquid Controls, LLC**  
**Stationary Wholesale Meter**  
**Meter Models: LCMAG, HMSXX00 Series or ISOMAG, MSXX00 Series;**  
**Sizes X32, X40, X50, X65, X80 or X100**

**Application:** For use in stationary wholesale applications. The magnetic inductive flowmeter may be used to measure agricultural liquids with specific gravities as outlined in the table below.

Product Subgroup	Typical Products	Specific Gravity	Viscosity	% Abrasive Solids
Fertilizer Suspensions	10-34-0	1.40	125 CPS	4%
	10-32-0-2	1.39		

**Flow Rates:**

Flowmeter Series Model Numbers <sup>1</sup>	Meter Size	Flow Rates (gpm)
HMSXX00 - X32 or MSXX00 - X32	1-1/4"	26 - 130
HMSXX00 - X40 or MSXX00 - X40	1-3/4"	40 - 200
HMSXX00 - X50 or MSXX00 - X50	2"	64 - 320
HMSXX00 - X65 or MSXX00 - X65	2-1/2"	106 - 530
HMSXX00 - X80 or MSXX00 - X80	3"	160 - 800
HMSXX00 - X100 or MSXX00 - X100	4"	240 - 1200

<sup>1</sup>Model numbers may be followed by suffixes indicating various non-metrological options provided.

**Identification:** An identification badge is secured to the exterior housing of both the meter and the converter.

**Sealing:** The converter is sealed by closing the switch on the printed circuit board and then sealing the external enclosure with a seal wire through a hole in the heads of two of the screws securing the wiring compartment. The meter does not require sealing.

**Operation:**

**General:** For detailed operating instructions, the Installation and Operation Manual should be used. There are three keys on the front of the converter housing. These keys are used to calibrate the unit. The function of each key changes with long versus short presses (greater or less than one second, respectively) of the key. The key symbol is shown with no background fill for a short press. Once the unit is sealed, the keys cannot be used.

**NOTE:** The unit cannot be sealed when calibration parameters are being checked. Unit must be unsealed to either read and/or change calibration parameters.

**Calibration:** In general, the only calibration necessary should be to "zero" the device. It is critical for this operation that the meter be filled with fluid and that the fluid be absolutely still. It is possible that other parameters will need to be adjusted to customize the specific installation. Those parameters which must be set to specific values are as follows:

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**Operation (Continued):**

- Display Mode: Cannot be set to the graphical view for custody transfer applications unless there is another counter present in the installation. This is because there is no totalizer displayed in the graphical mode.
- Fsl: Must be set to match the maximum flow rate on the meter and/or the maximum flow rate of the installation, whichever is less. This is because if it is set too low, the meter will show out-of-range errors.
- Cut-off=%: Low flow zero threshold must be set between 0.1 - 5%. 5% is the default setting.
- Inputs: The inputs must not be used for custody transfer applications.
- Tot. Decimals: Must be set to show the desired number of decimals in the display.

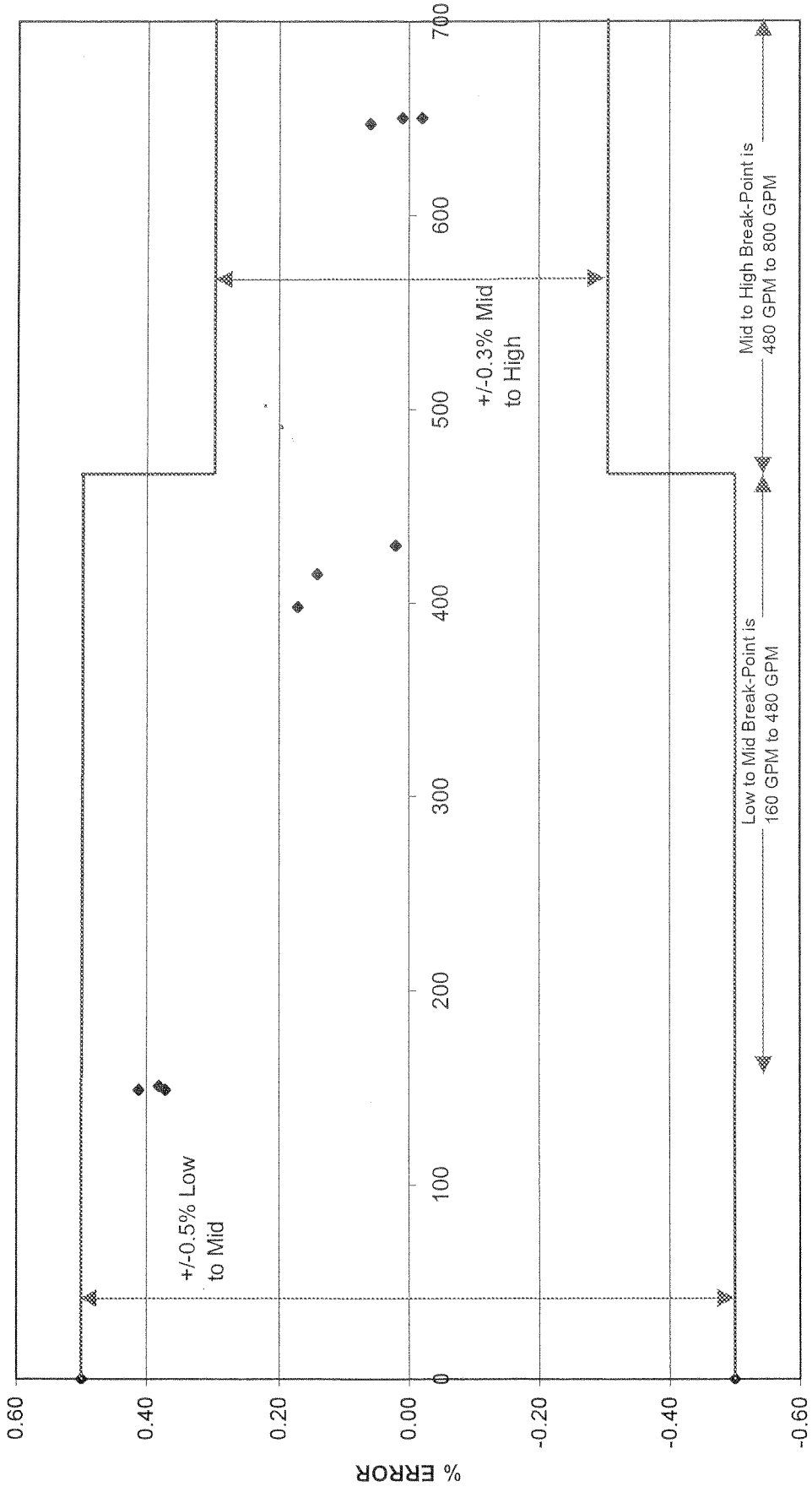
**Test Conditions:** The Model HMS2500-T40-6-A-1-A flowmeter was interfaced with the Model HML200-B-0-A-1-B-2-A converter and tested at an agricultural facility in Iowa. The tests were performed using 10-32-0 liquid fertilizer as the test liquid. The flowmeter was initially tested with flow rates of 97%, 62%, and 19% of the maximum rated flow. After a throughput of 740 649 gallons, the testing was repeated.

The Model HMS2500-T80-6-A-1-A flowmeter was interfaced with the Model HML200-B-0-A-1-B-2-A converter and tested at an agricultural facility in Iowa. The tests were performed using 10-34-0 liquid fertilizer as the test liquid. The flowmeter was initially tested with flow rates of 85%, 56%, and 20% of the maximum rated flow. After a throughput of 1 725 798 gallons, the testing was repeated. An acceptance tolerance of 0.3% and 0.5% as specified in the Liquid Measuring Devices Code of the National Institute of Standards and Technology Handbook 44 was applied.

**Type Evaluation Criteria Used:** NIST Handbook 44, 2000 Edition

**Tested By:** D. Reiswig (CA), A. Oman (IA)

3" HMS2500-T80-6-A-1-A Sensor with HML200-B-0-A-1-B-2-A Converter  
 Weights & Measures Test in Hampton, IA 2/22/00 and 2/23/00



FLOW RATE GPM

1-1/2" HMS2500-T40-6-A-1-A Sensor with HML200-B-0-A-1-B-2-A  
 Weights & Measures Test in Hampton, IA 2/22/00 and 2/23/00

