NATIONAL TYPE EVALUATION PROGRAM

Certificate of Conformance

for Weighing and Measuring Devices

For:
Meter Controller
Register for Meter, Digital Electronic, Stationary
Console Controller
Model: T7

Submitted By:
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Standard Features and Options:

T7 Control / Interface

- T7 touchscreen HMI in sealed case with USB thumb-drive (optional side-mounted) for on-board data logging
- Integrated PLC with two RS-485 (Modbus) master ports—one communicates with the VFD, the other with the Micro Motion Core Processor; no analog loops required
- Closed-loop PID speed control: real-time mass flow from the Coriolis meter feeds the PLC, which sends a Modbus frequency command to the VFD each scan to maintain the desired flow rate (DFR) and/or target value
- Operator modes selectable on the HMI: continuous-rate, batch-total, and terminal
- Local digital I/O pre-wired in PLC logic: START, STOP, RESET, and VFD fault feedback, plus Ethernet pass-through for plant SCADA
- HMI operator screens display live flow, total, DFR, target, and VFD status
- System architecture and control logic are independent of Coriolis sensor size; all mass flow, density, and temperature data are read digitally via Modbus from the Micro Motion Core Processor
- Designed for use with NTEP-certified Micro Motion Coriolis sensors covered by an active NTEP Certificate of Conformance and utilizing a compatible Micro Motion Core Processor; the T7 reads digital mass-flow values from the Core Processor and does not alter, scale, or reinterpret metrological data
- The configuration evaluated under this certificate uses the Coriolis sensor and Micro Motion Core Processor communicating directly with the T7 over RS-485 Modbus; no separate Micro Motion transmitter is used or required.
- Compatibility extends to any Micro Motion Coriolis sensor model covered by an active NTEP Certificate of Conformance, without dependence on sensor nominal size or flow capacity

This device was evaluated under the National Type Evaluation Program 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. *Editorial changes, not affecting the type or metrological content, corrected this certificate.

Jason Flint
Chair, NCWM, Inc.

Kevin Schnepp
Chair, NTEP Committee
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Meter Controller / T7

Application: Measurement and control of fluids compatible with the Micro Motion Coriolis sensor model covered by an active NTEP Certificate of Conformance in use, including but not limited to liquid anti-strip, warm-mix, and similar liquid additives, in asphalt-binder or comparable process streams at terminal, drum, batch, or tank-blend facilities.

T7 HMI and PLC communicate with the VFD and Micro Motion core processor exclusively over Modbus on dual RS-485 ports; no analog loops are used.

The system supports multiple operator-selectable modes (e.g., continuous delivery, batching, or other control sequences), all of which use non-metrological pump-control features. No operating mode alters or substitutes metrological values from the approved meter.

The PLC's PID loop adjusts VFD speed to hold the operator-entered Desired Flow Rate (DFR) using real-time mass-flow feedback from the approved Coriolis meter.

The T7 control interfaces directly with the Micro Motion Core Processor over RS-485 Modbus and processes mass-flow data digitally without altering, scaling, or reinterpreting metrological values. No separate Micro Motion transmitter is used or required. Compatibility is independent of Coriolis sensor nominal size and is governed by the active NTEP Certificate of Conformance applicable to the Coriolis sensor in use.

The T7 system may be used in conjunction with positive-displacement or other suitable pumping equipment appropriate for the process fluid and service conditions; pump type, size, and construction are application-dependent and are not part of the metrological function of the certified system.

The approved mass-flow operating range of the integrated system is determined solely by the active NTEP Certificate of Conformance applicable to the Coriolis sensor in use; system operation shall not exceed meter-specific limits published in the applicable certificate.

A USB thumb-drive (front or optional side-mount) automatically stores a JPG snapshot of the Micro Motion calibration page and a time-stamped CSV log whenever the Mass Factor is edited; a USB device must be inserted before a calibration edit can be saved. START operation and EXIT from the Meter page are locked out when the USB device is not inserted.

Field wiring may extend up to 300 ft between the control panel and the injection point without signal repeaters.

Local digital I/O is limited to START, STOP, RESET, and VFD-fault feedback; emergency-stop circuits and alarm beacons are outside the scope of this certificate.

The system operates from a single-phase 120 V supply feeding both the T7 panel and the 1 HP VFD; no auxiliary instrumentation power is required.

Pumps, heaters, injection hardware, and any SCADA gateways remain outside this Certificate of Conformance and must not impair sealed meter or T7 control functions.

Identification: At power-up the T7 displays firmware in the lower-left corner:

T7.xx 20xx.xx

where **T7.xx** is the HMI firmware revision and **20xx.xx** is the corresponding PLC firmware.

The same string is repeated in the upper-right corner of the **Meter Setup** page, which can be opened at any time during normal operation. Each JPG snapshot that the system saves to the USB drive when 'Exiting' the Meter setup page, embeds this firmware string, ensuring the audit trail carries the current identification data.

Sealing: The T7 control panel is treated as a *Category 3 electronically sealed device*.
All metrological parameters—including Mass Factor, Sensor Cal Data, and out pulse amount—sit behind a pass-code screen. Any change:

BearCat Pumps
Meter Controller / T7

- Requires a USB drive to be inserted.
- Triggers an automatic JPG capture of the meter-calibration page.
- Editing the mass-factor screen automatically snapshots the Micro Motion calibration page as a JPG and timestamps it to the USB drive for every change
- All JPG calibration captures and daily CSV totals (flow, total, DFR, and target set-points) are written to the USB for NIST HB-44 audit review
- Password protection blocks unauthorized entry to calibration or setup menus

Because the electronic audit trail is self-generated and tamper-resistant, only **one physical seal** is required (for the T7 Control): a simple wire-and-lead (or serialized plastic) seal through the enclosure latch. Breaking it is the sole way to reach the PLC, VFD keypad, or internal wiring.

No separate Micro Motion transmitter is used or required in the evaluated configuration; therefore, transmitter-specific sealing requirements are not applicable to this configuration. Metrologically significant parameters accessible through the T7 are protected by the Category 3 electronic sealing and physical sealing provisions described above.

Operation: On power-up the panel shows BearCat Pumps T7.xx 20xx.xx.
The operator runs in Manual or the single automatic mode configured by maintenance (Continuous-Rate, Batch-Total, or Terminal); switching modes requires a pass-code.

Run screen

- Live flow, running total, tank level, and VFD / meter diagnostics.
- START begins delivery.
- RESET finalizes the current delivery total and immediately writes the current totals to the CSV log on the USB drive.

An optional Auto-Log timer can be enabled during continuous operation; at each interval it writes the same totals to the CSV file.

Manual page shortcuts

- M → pass-code → Meter Calibration.
- S → pass-code → Screen Setup.

Manual mode drives at the ± Start-Hz value.
Automatic modes: The system supports multiple automatic operating modes that employ combinations of non-metrological pump-control functions (e.g., adjustable flow rate, sequencing, slow-down zones, Target Stop). These functions may influence how product is delivered but **shall not affect the metrological function or the metered values generated by the approved Coriolis meter.**
All CSV log entries are time-stamped, non-editable once written, and retained in non-volatile memory; files may be copied to USB whenever needed.

Test Conditions: This certificate of conformance supersedes Certificate of Conformance Number 25-066A1 and is issued to clarify the system architecture originally evaluated under Certificate of Conformance Number 25-066 and does not represent a change to the evaluated metrological system. No additional testing was deemed necessary.

Certificate of Conformance Number 25-066A1: This certificate of conformance supersedes Certificate of Conformance Number 25-066 and is issued to update the capabilities of the device that were tested previously but not formerly mentioned on the certificate. Previous test conditions are listed below. No further testing was required.

Certificate of Conformance Number 25-066: All capabilities and functions of the Model T7 were tested at the manufacturer's facility. The evaluated configuration consisted of a Micro Motion Coriolis sensor and Core Processor communicating directly with the T7 over RS-485 Modbus. No separate Micro Motion transmitter was included in or required by the evaluated system. Accuracy and meter calibration features were tested to check volume changes and Category 3 sealing logging and incrementation. This device

BearCat Pumps
Meter Controller / T7

interacts with the main product mixing system and increases or decreases the additive. Four tests at each of five flow rates were performed to ensure the accuracy of the meter at any flow rates needed.

Evaluated By: A. Katalinic (NCWM) 25-066 (CN 11356); A. Katalinic (NCWM) 25-066A1 (CN 11628); G. Gholston (NCWM) 25-066A2 (CN 11894)

Type Evaluation Criteria Used: *Handbook 44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*, 2026 Edition. *NCWM Publication 14: Measuring Devices*, 2025 Edition.

Conclusion: The results of the evaluation and information provided by the manufacturer indicate the device complies with applicable requirements.

Information Reviewed By: J. Gibson (NCWM) 25-066, 25-066A1, 25-066A2

Examples of Device:

