

National Conference on Weights and Measures
1135 M Street, Suite 110 • Lincoln, NE 68508

Certificate Number: 09-057

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

For:

Electronic Computer for Motor Fuel Dispensers
Model: VRR-100
Total Money \$999,999
Total Quantity 999,999/Gallon
Total Unit Price \$999.999/Gallon

Submitted by:

Triangle MicroSystems, Inc.
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Raleigh, NC 27616
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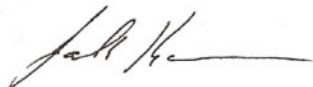
Standard Features and Options

Alphanumeric Display
Electronic Digital Displays, Money, Gallons, Pricing
Electronic Optical Encoder (Pulser)
Touch Keypad for Programming Modes
Stand Alone & Console operation permitted
Battery Backup
Maintains Non-resettable Electronic Totalizers for Money and Volume
Digital Indications
Factory Settable Meter Ratios (Revs. per Gal.)
Electronic Calibration
Sealable Calibration Switch
Allows Preset, Prepay, Post Pay

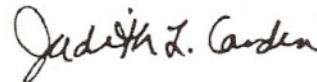
Equipment that can be Interfaced

Mechanical Coupling to Dispenser Meters
TMS MPC, EZ-8 & EZ-16 Consoles
POS Systems, that are compatible with Tokheim, Wayne, Bennett and Gilbarco Dispensers

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.



Jack Kane
Chairman, NCWM, Inc.



Judith L. Cardin
Chairman, National Type Evaluation Program Committee

Issued Date: July 9, 2009

Note: The National Conference on Weights and Measures 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 or material by the NCWM.

Triangle MicroSystems, Inc.
Electronic Computer for Motor Fuel Dispensers
Model: VRR-100

Application: For use as an electronic replacement for a mechanical, analog computer on a retail motor fuel dispenser/pump. The VRR-100 can be used with existing, rebuilt or new pump/dispensers. The VRR-100 displays the Total Sale, Total Gallons and the Price per Gallon. The VRR-100 is directly connected to the fuel metering device and is factory preset to match the revolutions per gallon of the respective meter. The direct connection is made through a pulse generating device (optical encoder). The VRR-100 generates the pulses at a rate of 128 pulses per revolution of the respective meter. The pulses generated are converted to total money and gallons based on the price per gallon setting. The pricing can be set at the pump when in "stand alone" operation or through a remote compatible console.

Identification: A tamper proof label will be attached to the VRR-100 in the lower left corner of the unit. The label will display the company name, model number, serial number and the Certificate of Conformance #. The label may be metal or other material that cannot be removed without noticeable alteration.

Sealing: The mechanical dispenser/pump equipped with VRR-100 has three (3) locations for security seals. The resident mechanical meter is to have a security seal on the meter adjustment and the VRR-100 calibration switch is to have a security seal and the VRR-100 display board will have a security seal (see illustrations on last page of COC) to be installed by authorized state agents, or licensed equipment service personnel. Note: In order for the VRR-100 to properly calibrate the dispenser/pump assembly the resident meter must be calibrated to within ± 9 in³ prior to calibrating the VRR-100.

Operation: The VRR-100 is connected to the dispenser/pump meter via a rigid shaft to a pulsing device and the resultant output pulses generated are sent to the CPU board and are the basis for calculating the total sale and the total volume. If the unit is programmed to operate in stand-alone condition the price is controlled through the VRR-100 keypad. If the VRR-100 is controlled by a remote console or POS the price will be controlled by the console or POS. If there is a power failure the CPU backup battery will hold the display information for a time period 15 minutes or greater. The VRR-100 will respond to console direction for Price Per Unit, Preset, Prepay, and Pump Stop commands. Once the unit is authorized for the next sale the VRR-100 will not open the valves until the handle switch is activated. The dispenser can be shut off by turning the handle switch off or by console control.

Calibration of the VRR-100 is accomplished electronically. On the display board with the keypad, there is a clearly identified calibration switch on the left side of the display that is prevented from being turned to the "ON" calibration mode by two washers on a protruding threaded shaft, held in place by a lock nut and security seal. A hole in the threaded shaft allows a security wire/seal to be positioned such that the nut cannot be removed, holding the washers in place thereby preventing the calibration switch from being turned into the "ON" (down) position. A second security seal is positioned on the right side of the display face with the keypad. This seal prevents the display board from being lifted from the back of the display face, thereby allowing the calibration switch to be removed from the locked position. When the security seal, nut and washers are removed the calibration switch is activated by pushing the switch into the down position and the display will then show the calibration mode. Using a certified test measure, fuel is dispensed to a specific prover volume to within $(+ \text{ or } - 9 \text{ in}^3)$. The amount of difference between the prover meniscus $(+ \text{ or } - 9 \text{ in}^3)$ and the "zero" level on the prover is entered via the keypad. After pressing the keypad "enter" key the VRR-100 unit displays, F1 "above" or F2 "below". Select either F1 for above the "zero" mark or F2 for below the "zero" mark, depending on whether the meniscus was above or below the "zero" mark and press "enter". The display then allows the measured difference to be entered between "-9.9" and "+9.9". Keying in the number on the keypad and pressing "Enter" resets itself for the corrected number of "pulses" per unit of volume for this particular meter/computer assembly, thereby calibrating the VRR-100. Moving the calibration switch into the "OFF" (up) position returns the VRR-100 to normal retail operation. Reattaching the washers, lock nut and security seal and the second security seal holding the display board in place prevents the calibration mode from being activated.

The programming keypad positioned on the VRR-100 housing is covered by the outer dispenser housing and cannot be accessed during normal retail operations. Only the facility owner or certified technician will have access to the dispenser/pump keypad. The keypad allows entry into all function/programming modes except the calibration mode, via a password. The programming F1 functions are the "hose address (1 thru 16)", "stand alone/console control (0 or 1)", "price per gallon (0 to \$999,999)", "assign dollar decimal point (0,1 or 2)", "assign decimal point to the gallon volume (0,1,2,or3)", "assign decimal point to total price per gallon (0,1,2,or3)", "slow down (.05 to .250 gallons)", "maximum allowable pump volume per sale (0 thru 999,999 gallons)", "maximum allowable pump dollars per sale (0 thru \$999,999)", and a "time out (0 thru 99 minutes)". The "F2" reset function allows the VRR-100 microprocessor to be reset, without eliminating any stored data or any the previous sale that was displayed.

Access to the "Non-Resettable" money and volume totalizers reading can be obtained via the programming keypad. Press the "Prog" key and then the "F3" key. This will allow the money totalizer to be displayed. Press "F3" key again allowing volume totalizer reading to be displayed. In each case the totals begin with the whole digits in the upper display window and continue into the middle display window. These "non-resettable" totals can be retrieved by the console or POS controller attached to the VRR-100. Continuing to press the "F3" key will also display the software version and the meter ratio that was programmed at the factory. Press "Cancel" twice to return to standard operation.

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Test Conditions: The VRR-100 was tested at TMS's laboratory facility for basic operation, design and calibration. The unit was interfaced with an MPC console and attached to a Bennett pump running Varsol fluid through a closed loop hydraulic system. The evaluation included sales, power outage conditions relative to holding display information, computing total sale accuracy, unit price changing, preset, prepay, post pay, and calibration accuracy. Price changes can be made during use, however the price per unit volume window will not change until the current transaction has been completed and cleared by the console or POS. Similar tests were performed at a field installation on a Tokheim pump using gasoline and that had been in continuous operation for at least a 30 day period. Tests of appropriate drafts and flow rates were initially conducted on each and repeated in approximately 30 days after required throughput.

Evaluated By: Jerry Butler (NC)

Type Evaluation Criteria Used: NIST Handbook 44, 2009 Edition; NCWM Publication 14, 2009 Edition

Conclusion: The results of the evaluations and information provided by the manufacturer indicate the devices comply with applicable requirements.

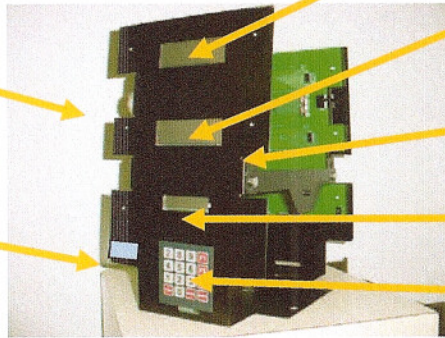
Information Reviewed By: J. Truex (NCWM)

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Example of Device(s):

The calibration switch is on one side only and is located here.

Identification label.



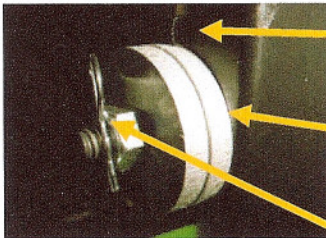
Total Sale

Total Volume, Gallons


2nd Security Seal Goes Here

Price per Gallon

Programming Keypad

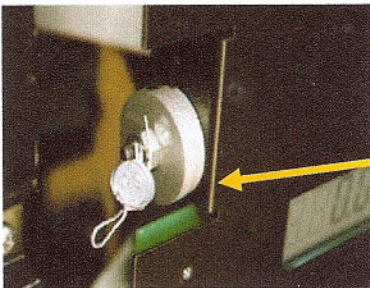


Calibration Switch

Calibration Switch 

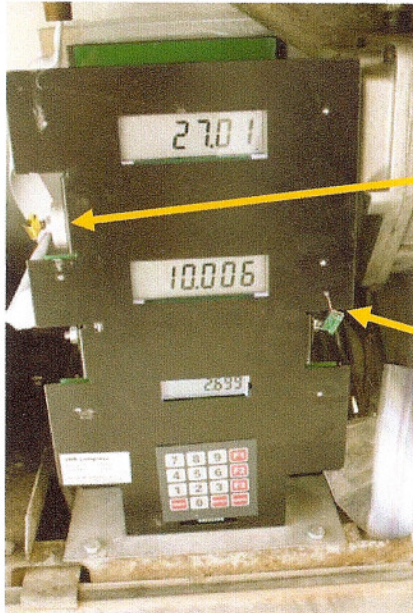
Locking washers- can only go on the shaft in one position.

Removable Bridge Pin shipped with VRR-100 from the factory. It must be replaced with the security seal after calibration as shown below.



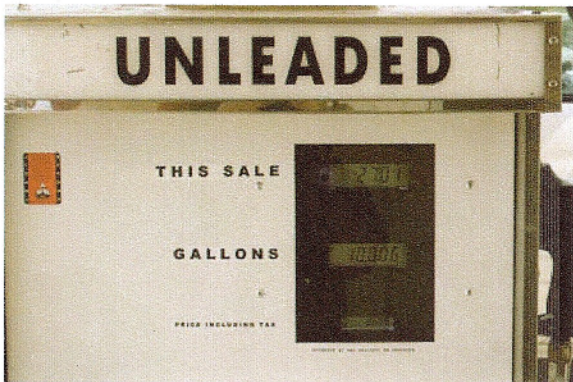
Calibration switch shown with security seal shown in place.

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Calibration switch shown with security seal in place.

Security seal shown sealing the display board in place.



VRR-100 shown in retail fuel pump