NUFLO™

Scanner® 2000 microEFM

The NuFlo Scanner 2000 microEFM packs the gas and steam measurement capabilities traditionally found in large flow computers into a compact, low-power instrument. The explosion-proof instrument is simple to operate and can be powered for 1 year or longer with a lithium battery pack.

Simplicity and ease of use are integral to this instrument's design. Basic parameters can be configured quickly from the front panel keypad without the use of a computer. All other parameters are easily configured via the ModWorX™ Pro software provided free of charge to customers.

Applications

Powered by a single lithium battery pack, the Scanner 2000 is ideal for installations where solar panels and external power supplies are impractical or cost-prohibitive.

The Scanner 2000 is an economical chart recorder replacement, a flow computer, and a stand-alone totalizer. Its measurement capabilities include compensated gas and steam measurements based on inputs from differential producers such as orifice plates or cone meters. A turbine input can be used for liquid measurement or compensated gas measurement in accordance with AGA-7. Modbus® protocol and two RS-485 communication ports allow remote communication to host systems. The instrument's ability to measure gas and water simultaneously is also a clear advantage for coalbed methane operators.

Expanded Input/Output

The standard Scanner 2000 features a highly accurate integral multi-variable transmitter, a process temperature input, a turbine meter input and a digital output that can be configured as a volumetric pulse output or an alarm.

Now, an expanded input/output option board gives users the added functionality of a second turbine meter input, a pulse input, two analog inputs, and an analog output. The expansion board also packs the memory to boost the Scanner's archive capacity to 6392 interval records.

The Scanner 2000 offers

- Low-power operation for remote installations
- Fully autonomous operation via lithium battery pack (1-year typical)
- Explosion-proof enclosure
- Extremely accurate, stable and repeatable input readings using an integral MVT
- API 21.1 compliant
- Archives up to 16 user-selectable parameters
- Generous log capacity: 768 daily records, 2304 interval records (6392 with expansion board option), 1152 event/alarm records
- Two RS-485 communication ports
- Modbus® protocol
- Fast data transfer: full archive download in approximately 3 minutes with main board only (6 minutes with expansion board option)
- Configurable inputs/outputs (now expanded with option board)
- Easy-to-read LCD
- Quick and easy configuration and calibration (1 to 12 calibration points available for all inputs)
- Non-volatile memory
- Performs industry standard calculations: AGA-3, AGA-7, ISO 5167, AGA-8 (Detail & Gross), GPA 2172, Cone, and IF-97 (Steam)

Certification

- Standard Scanner 2000
  - CE approved
  - ATEX-certified, II 2 GD Ex d IIC T6 IP68 (-40°C to 70°C)
  - CSA-certified for US and Canada Class I, Div. 1, Groups B, C, D (explosion-proof), Type 4 enclosure
- Scanner 2000 with Expansion Board
  - CSA-certified for US and Canada Class I, Div. 1, Groups B, C, D (explosion-proof), Type 4 enclosure

Mounting Options

The Scanner 2000 microEFM can be mounted directly to an orifice meter run using a flange-by-flange manifold, or mounted directly to a Barton® 7000 Series turbine meter (shown). Alternatively, an optional hardware kit allows the instrument to be mounted to a 2-inch pole or bulkhead.

Display

- Two-line LCD with easy-to-read alphanumeric characters
  - 8-digit display of values (top line)
  - 6-digit display identifies each scrolling parameter and its engineering unit (bottom line)
- View up to 12 user-defined parameters
- View daily log data (99 days)
- User-selectable units of measurement
- Character height - 0.3 in.
- Adjustable contrast and update period

Power Supply Options

- Lithium battery pack – 1-year typical life (main or backup power supply)
- External power supply (6 to 30 VDC) with internal battery backup

Calculations

- Flow rate
  - AGA-3
  - AGA-7
  - ISO 5167
  - Cone
- Fluid properties
  - AGA-8-92 (Detail and Gross)
  - GPA 2172
  - IF-97 (Steam)
- Wet correction (Steam)
  - James (Orifice)
  - Chisholm (Orifice)
  - Steven (Cone)

Communications/ Archive Retrieval

- Modbus (RTU) with two on-board RS-485 communications slave ports
  - COM 1 and COM 2 baud rates: 300 to 38.4K
- Enron Modbus compliant downloads
- User-defineable block reads allows the grouping of up to 25 floating point values for faster data transfer when used with a SCADA system
- Full archive download in approximately 3 minutes with main board only (6 minutes with expansion board option)
- Explosion-proof control switch option
  - Push-button control of display parameters and daily log views
  - Eliminates need to open enclosure
- Explosion-proof communications adapter option
  - Quick connect to communications port for laptop
  - COM adapter installs in conduit opening for easy access
  - Eliminates need to open enclosure

Inputs

Turbine Meter Inputs 1 and 2 (Expansion Board Required for Turbine Input 2)

- Configurable sensitivity adjustment (20 mV to 200 mV, peak to peak)
- Frequency range: 0 to 3500 Hz
- Input amplitude: 20 mV to 3000 mV, peak to peak
- Turbine Input 2 cannot be used simultaneously with a pulse input

Pulse Input (Expansion Board Required)

- Accepts a signal from a turbine meter or PD meter
- Optically isolated
- Input: 3 to 30 VDC or contact closure
- Cannot be used simultaneously with Turbine Input 2

Analog Inputs 1 and 2 (Expansion Board Required)

- 3-wire sensor interface
- Sensor power same as external power supply for main board (6 to 30 VDC)
- Accuracy: 0.1% of full scale
- Temperature effect: 0.25% of full scale over operating temperature range of -40°F to 158°F (-40°C to 70°C)
- Resolution: 20 bits
- User-adjustable sample time and damping

Process Temperature Input

- 100-ohm platinum RTD with 2-wire, 3-wire, or 4-wire interface
- Sensing Range: -40°F to 302°F (-40°C to 150°C)
- Accuracy: 0.2°C (0.36°F) over sensing range at calibrated temperature
- Temperature effect (Fahrenheit): 0.54°F over operating range of -40°F to 158°F
- Temperature effect (Celsius): 0.3°C over operating range of -40°C to 70°C
- Resolution: 24 bits
- User-adjustable sample time and damping

Outputs

Digital Output

- Configurable as pulse output or alarm output
- Solid-state relay
- Output rating: 60 mA max @ 30 VDC
- Pulse output
  - Configurable pulse duration
  - Configurable pulse representation (1 pulse = 1 MCF)
  - Based on any accumulator (flow run or turbine inputs)
- Alarm output
  - Low/high
  - Out-of-range
  - Status/diagnostic
  - Latched/unlatched
  - Normally open/normally closed

Analog Output (Expansion Board Required)

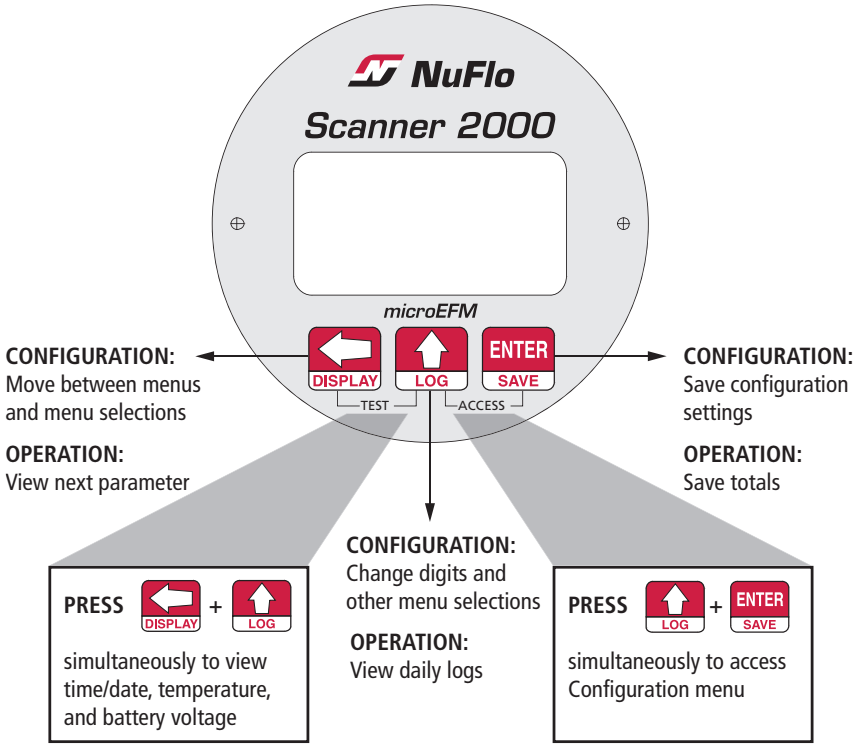
- 4-20 mA
- Accuracy: 0.1% of full scale @ 25°C (77°F), 50 PPM/°C (27.8 PPM/°F) temperature drift
- Represents any measured variable (e.g., differential pressure) or calculated parameter (e.g., flow rate)
- Optically isolated
- Resolution: 16 bits

Memory

- Non-volatile memory for configuration and log data
  - 256 KB (512 KB with expansion board option)
  - Data stored for 10 years without power

Keypad Configuration

With the three-button keypad, changes to basic parameters can be made quickly and easily simply by removing the enclosure lid (computer software is not required). The slave address, baud rate, date and time, and orifice plate size can all be configured from the keypad.



MVT

- Provides linearized digital data
  - Static pressure
  - Differential pressure
- NACE-compliant units also available
- User-adjustable sample time and damping

MVT Accuracy

- Stability: Long-term drift is less than ±0.05% of URL per year over a 5-year period
- Differential pressure: ±0.05% of span
  - Effect on differential pressure for a 1000-psi change in pressure
    - Zero shift: ±0.05% of URL
    - Span shift: ±0.01% of reading
- Static pressure: ±0.05% of span
- Temperature performance: 0.25% of full scale over full operating temperature range
- Resolution: 24 bits

Maximum Operating Conditions

Static Pressure (PSIA)	Differential Pressure (In. H_2O)	Safe Working Pressure (PSIA)
100	30	450
300	200	450
	840	450
500	200	750
1500	200	2250
	300	2250
	400	2250
	840	2250
3000	200	4500
	300	4500
	400	4500
	840	4500
5300	200	5800
	300	5800
	400	5800
	840	5800

Environmental

Operating Temperature Range

- -40°F to +158°F (-40°C to +70°C)
- LCD contrast is reduced below -22°F (-30°C)

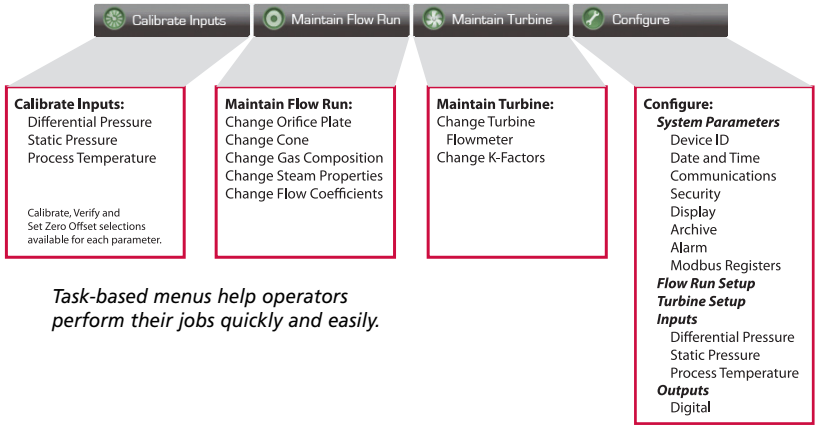
Audit Trail

- Daily records: 768 (>2 years)
- Interval records: 2304 (>3 months of 1-hour intervals); 6392 (>8 months of 1-hour intervals) with expansion board option
  - Adjustable from 5 seconds to 12 hours
- Event/alarm records: 1152
- Records up to 16 user-defined parameters

Interface Software

- Provided at no charge
- Easy to use
- Real-time data polling
- Complete configuration
  - Configuration upload tool for configuring multiple units
- Multi-level security
- Field calibration
  - 1 to 12 calibration points for each parameter
  - Three methods: multi-point, set zero point, and verify
  - Inputs are automatically locked during calibration
- Maintenance
  - Change plate
  - Change cone (linearization: 1 to 12 points)
  - Change gas composition
  - Change steam properties
  - Change flow coefficients
  - Change K-factor (linearization: 1 to 12 points)
  - Change turbine flowmeter
- Archive data downloads
  - Configurable downloads of "all" or "new" records
  - Download types: daily, interval, and event/alarm records
  - Downloads are automatically saved in uneditable binary (SDF) files
  - Exports to .xls, .csv, .rtf, .html, and Flow-Cal® formats
- Reporting
  - Daily logs (table or trend graph)
  - Interval logs (table or trend graph)
  - Event/alarm logs
  - Configuration settings
  - Calibration settings
  - Snapshot of current status data and calculated parameters
- Online documentation
  - Quick Start guides
  - Hardware manual
  - Software manual

The ModWorX Pro software interface offers easy access to the most commonly used functions from one main display screen.



Task-based menus help operators perform their jobs quickly and easily.

MEASUREMENT SYSTEMS
Formerly: NuFlo Measurement Systems • Barton Instrument Systems • Caldon, Inc.

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