

NUFLO™

Scanner® 2000 microEFM

The NuFlo Scanner 2000 microEFM packs the gas, steam, and liquid measurement capabilities traditionally found in large flow computers into a compact, low-power instrument.

Simplicity and ease of use are integral to this instrument's design. Basic parameters can be configured quickly from a keypad inside the enclosure. All other parameters are easily configured using a PC or laptop and the ModWorX™ Pro software provided free with every Scanner 2000 purchase.

The Scanner 2000 is an economical chart recorder replacement, a flow computer, and a stand-alone totalizer. Its measurement capabilities include compensated gas, steam, and liquid measurements based on the differential pressure input supplied by an orifice plate or a cone meter, or the frequency input from a turbine meter. 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.

The Scanner 2000 microEFM is available in two packages: an explosion-proof package certified for use in hazardous areas, and a weatherproof package.

Explosion-proof Package

The explosion-proof package features:

- an explosion-proof enclosure
- an integral MVT
- Lithium battery (standard) for autonomous power
- External power supply (6-30 VDC) optional with internal battery backup
- Keypad for basic configuration inside the enclosure

Options include:

- Explosion-proof control switch
 - Push-button control of display parameters and daily log views
 - Eliminates need to open enclosure
- Explosion-proof communications adapter
 - Quick connect to laptop
 - Installs in conduit opening for easy access
 - Eliminates need to open enclosure
- Pole mount kit



Mounting options include:

- Direct mount to an orifice meter or cone meter using a flange-by-flange manifold
- Remote mount to an orifice meter or cone meter using a pole mount kit
- Direct mount to a Barton 7000 Series turbine meter

The explosion-proof package (both with and without the expansion board) has received the following approvals for hazardous area use:

- 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

Weatherproof Package

The weatherproof package features:

- an 8-in. square enclosure
- an integral MVT
- USB connection for downloading data to a laptop
- Lithium battery (standard) for autonomous power
- External power supply (6-30 VDC) optional with internal battery backup
- Solar power optional with internal battery backup
- Keypad for basic configuration inside the enclosure



Options include:

- Solar kit (solar charger and two rechargeable 6V batteries; solar panel sold separately)
- Radio kit
- Pole mount kit

Mounting options include:

- Direct mount to an orifice meter or cone meter using a flange-by-flange manifold
- Remote mount to an orifice meter or cone meter using a pole mount kit

* The weatherproof package has not been tested or certified for use in hazardous areas.

The Scanner 2000 offers

- Low-power operation for remote installations
- Fully autonomous operation via lithium battery pack (1-year typical)
- 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
- Fast data transfer: full archive download in approximately 3 minutes with main board only (6 minutes with expansion board option)
- Two RS-485 communication ports
- Modbus® protocol
- Configurable inputs/outputs
- A process temperature input, a turbine meter input, a digital output (volumetric pulse output or alarm)
- With expansion board, a second turbine meter input, a pulse input, two analog inputs, and an analog output
- 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, IF-97 (Steam), and API-2540 (Liquid).

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

Calculations

- Flow rate (Natural Gas, Steam and Liquid)
 - AGA-3
 - AGA-7
 - Compensated Liquid Turbine
 - ISO 5167
 - Cone
- Fluid properties
 - AGA-8-92 (Detail and Gross)
 - GPA 2172
 - IF-97 (Steam)
 - Generic Liquid (Water or Emulsions)
 - API-2540 Liquid (Crude Oil, Gasoline, Jet Fuel, Fuel Oils, Lube Oil)
- 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-definable 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)

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 800°F (-40°C to 427°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

Environmental

Operating Temperature Range

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

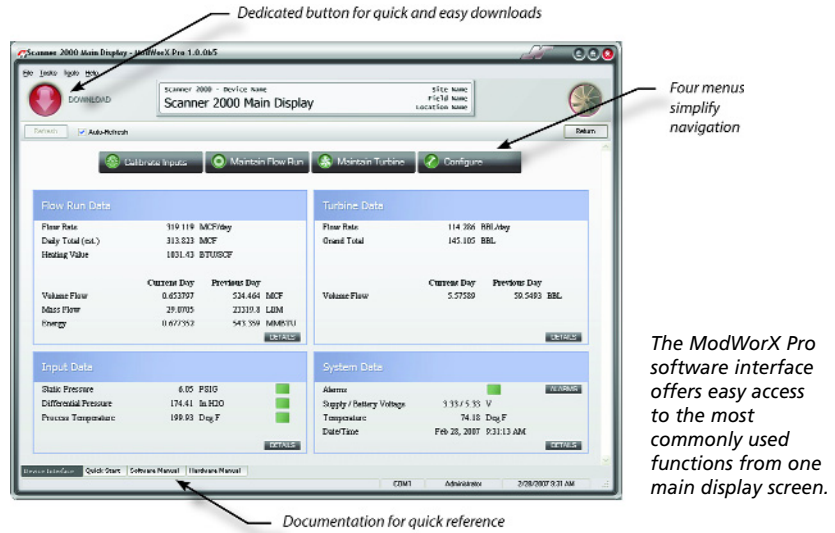
Audit Trail

- 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

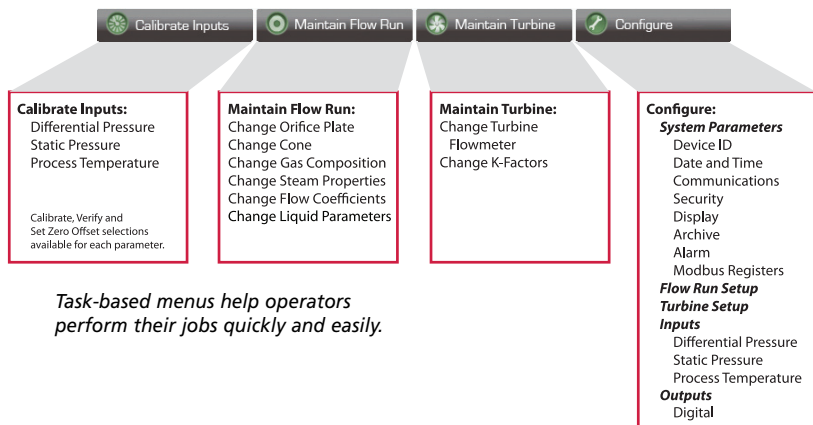
Interface Software

- 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 liquid parameters
 - 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

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