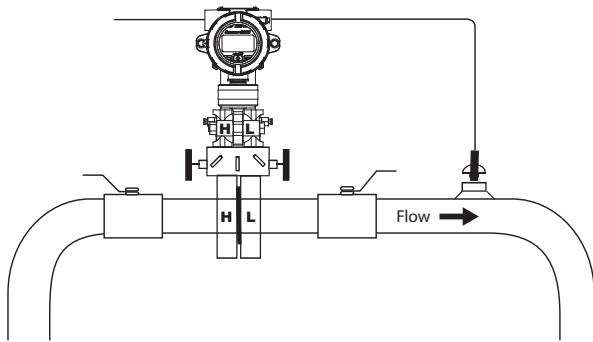


NUFLO™

Scanner® 2000 microEFM

QuickStart

Installing the Scanner 2000



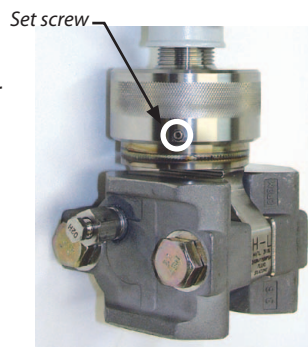
Direct Mount

To install the Scanner 2000 microEFM using a direct mount to an orifice or cone meter run, perform the following steps:

1. Determine the best location for the Scanner 2000.
 - a. For horizontal meter runs, locate process connections at the top of the line, and mount the Scanner 2000 above the pressure connections at the pipe.
 - b. For vertical meter runs, make sure pipeline flow is upward.
2. Locate the H and L markings on the Scanner 2000 transmitter designating high-pressure and low-pressure ports, and connect a valve manifold (if desired) to the transmitter.
3. Connect the orifice flanges to the Scanner 2000/manifold assembly, matching the upstream tap to the high-pressure manifold port and the downstream tap to the low-pressure manifold port.

ADJUSTABLE HEAD DESIGN.

When the sensor is oriented appropriately for pressure connections, the position of the Scanner display may need to be adjusted. To change the orientation of the head, loosen the set screw in the MVT adapter, rotate the head no more than 180 degrees and tighten the set screw.



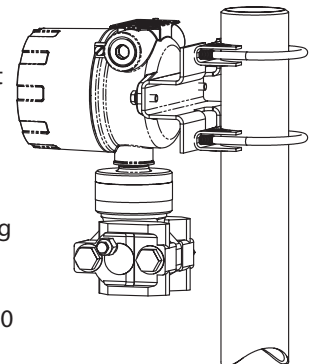
Remote Mount

To install the Scanner 2000 microEFM remotely from the flow run, perform the following steps:

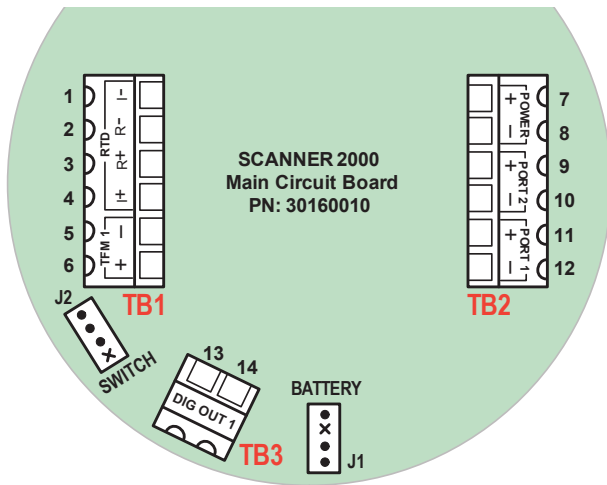
1. Mount the Scanner to a flat, vertical surface, or bolt to a 2-in. pipe using optional pole-mount hardware.
2. Install process tubing between the orifice run and the manifold, making sure that the upstream pressure tap is connected to the high-pressure manifold port and the downstream pressure tap is connected to the low-pressure manifold port. Slope all piping at least 1-inch per linear foot to avoid trapping liquid.
3. Use a suitable compound or tape on all threaded process connections.
4. Position all shutoff and bypass valves so they are accessible from the front of the instrument.
5. Check the manifold for leaks.

POLE-MOUNT OPTION.

An optional pole mount kit (Part No. 9A-30028004) allows the Scanner 2000 to be mounted to a 2-in. vertical or horizontal pipe. The kit includes a mounting bracket, two U-bolts and screws for connecting the bracket to the Scanner 2000 enclosure.



Wiring the Scanner 2000

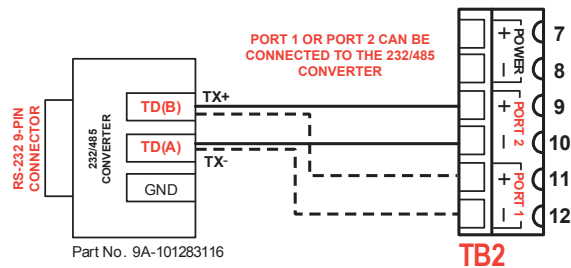


Field wiring enters the Scanner 2000 microEFM through either of two 3/4-in. NPT conduit openings in the enclosure and connects to three terminal blocks on the main circuit assembly (TB1, TB2 and TB3). For instructions on wiring an optional expansion circuit board, see the Scanner 2000 Hardware Manual.

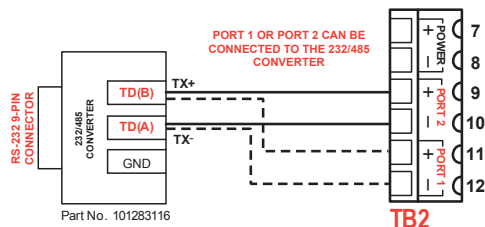
Scanner/Laptop Connection Options

- Scanner 2000 microEFMs connect to a laptop three ways:
- using an optional USB adapter and user-supplied USB cable (external port for easy access)
 - using an RS-485 to RS-232 converter cable (wires to circuit board)
 - using an optional COM adapter and RS-485 to RS-232 converter cable (external port for easy access)

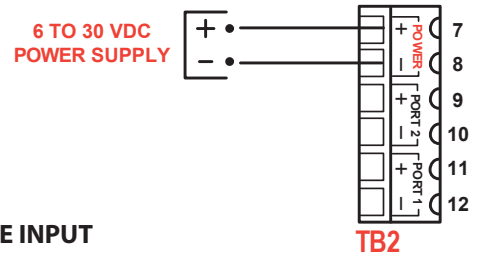
RS-485 TO RS-232 CONVERTER



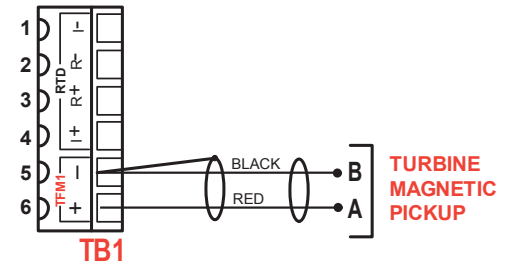
USB ADAPTER (OPTIONAL)



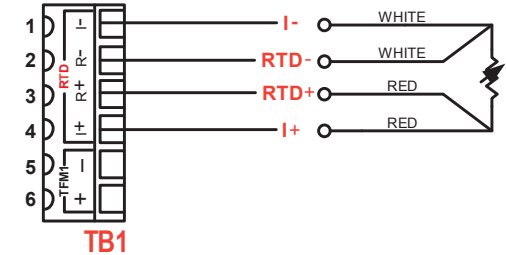
EXTERNAL POWER INPUT



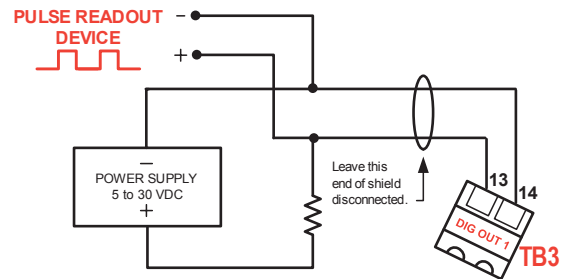
TURBINE INPUT



RTD INPUT



DIGITAL OUTPUT



Resistor may be included in pulse readout device. Size the resistor to limit the current to 60 mA.

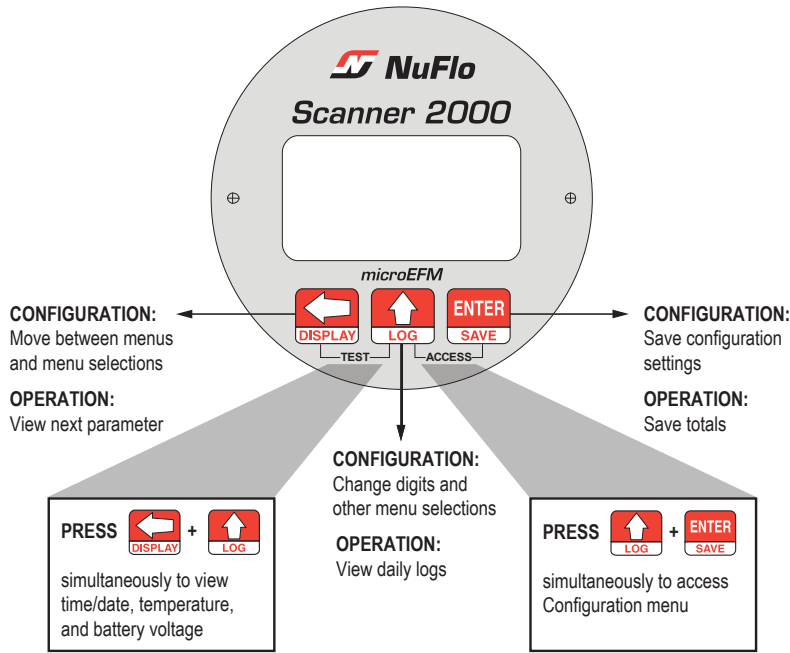
CAUTION—All field wiring must conform to the National Electrical Code, NFPA 70, Article 501-4(b) for installations within the United States or the Canadian Electric Code for installations within Canada. Local wiring ordinances may also apply. All field wiring must have a wire range of 22 to 14 AWG and terminal block screws must be tightened to a minimum torque of 5 to 7 in.-lbs. to secure the wiring within the terminal block. Only personnel who are experienced with field wiring should perform these procedures.

WARNING—To prevent ignition of hazardous atmospheres, do not remove the cover while circuits are alive. Under normal conditions, the Scanner 2000 microEFM poses no hazard when opened in a safe area.

Keypad Configuration & Controls

Remove the instrument cover to access the keypad. Each of the three keys are used for configuration and operation.

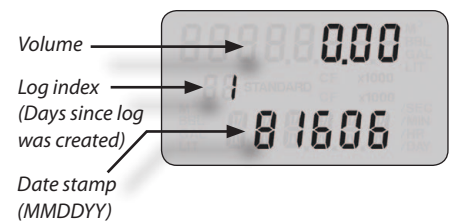
The following illustration defines the functions of each key.



CONTROL THE PARAMETER DISPLAY...
Press the LEFT ARROW (DISPLAY) button to manually advance the display of parameters in the LCD window.



VIEW DAILY FLOW LOGS...
Press the UP ARROW (LOG) button to view daily logs. The two-digit log index number to the left indicates the number of days that have passed since the log was recorded. A "1" for example will display yesterday's log value; a "2" will display the log value from 2 days ago. Up to 99 daily logs can be viewed using the keypad.



TO CONFIGURE THE INSTRUMENT....






Press the UP ARROW and ENTER buttons simultaneously to configure the following

- slave address
- contract hour
- baud rate
- plate size (if security settings allow)
- date and time



The following example demonstrates the steps required to enter a slave address.

To Enter a Port 1 Slave Address:

Enter the Configuration menu.	Press UP ARROW (LOG) and ENTER (SAVE) simultaneously.	 + 
Locate the Slave Address setting.	PORT 1 SLAVE ADDRESS will appear in the lower display, and the right-most digit in the top display will begin blinking.	
Enter the Slave Address. (range: 1 to 65535, excluding 252 through 255 and 64764)	Press UP ARROW (LOG) until the correct digit is displayed.	
	Press LEFT ARROW (DISPLAY) to select the next digit to the left.	
	Repeat using UP ARROW (LOG) and LEFT ARROW (DISPLAY) to enter all remaining digits. Press ENTER (SAVE).	

EXTERNAL SWITCH OPTION....

The external control switch option lets you control the display of parameters on the LCD and view daily logs without removing the cover of the Scanner 2000 microEFM.

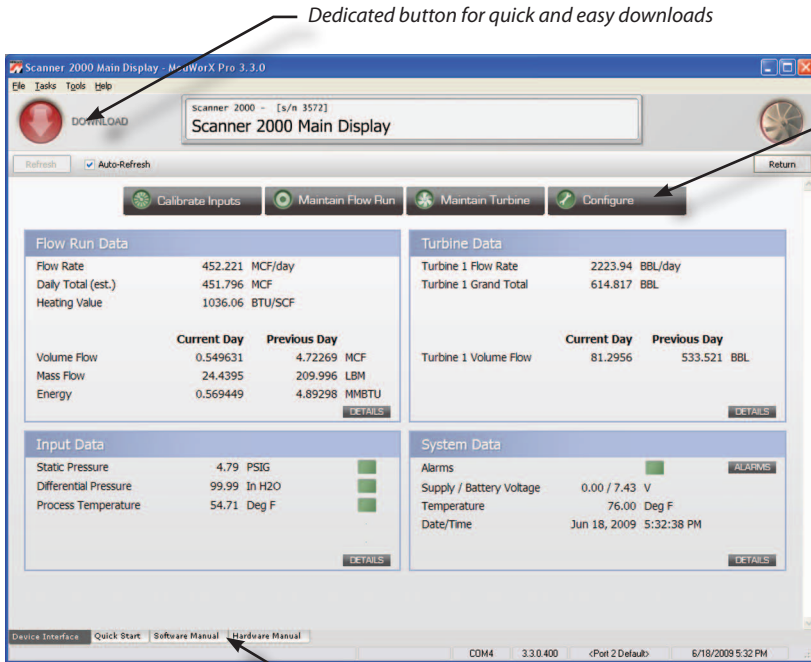


- Press and release the push-button to view the next parameter in the LCD window.
- Press and hold the push-button for 4 seconds to view the daily logs screen (shown above). Then press and release the push-button to view the next daily log.

Up to 99 daily logs can be viewed from the LCD using the keypad or external push-button switch.

Navigating the ModWorX Pro Interface

Main Display Screen



Dedicated button for quick and easy downloads

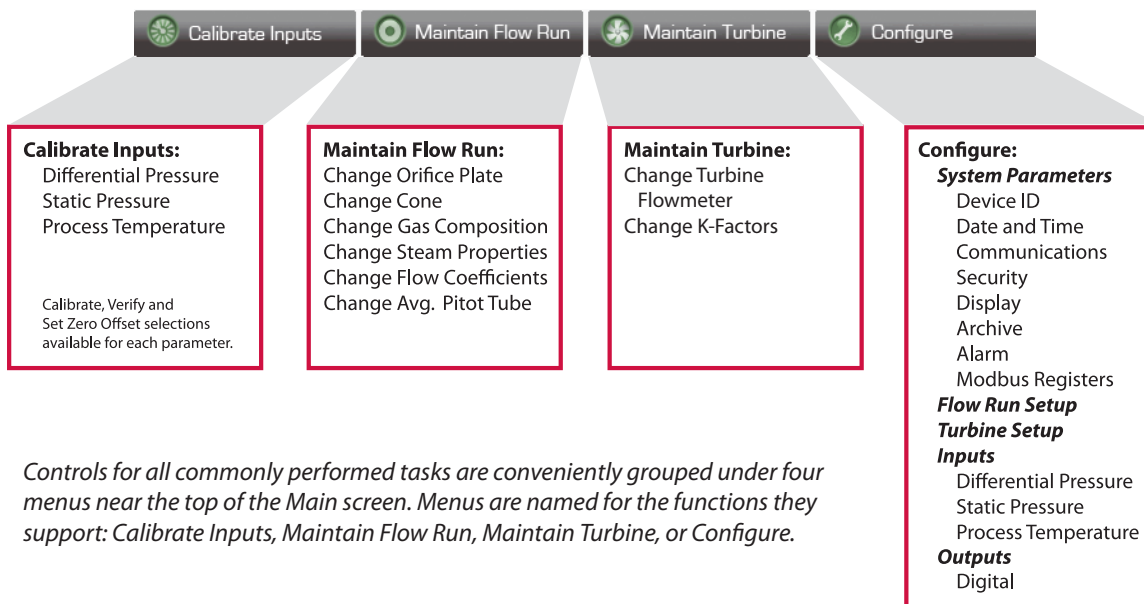
Four task-based menus simplify navigation

Documentation for quick reference

The Scanner 2000 installation CD provided with the instrument loads the ModWorX Pro interface software for configuring and operating the Scanner 2000.

The Main Display screen (at left) is the control center for the Scanner 2000 and provides quick and easy access to the most commonly performed tasks. From this screen, the user can:

- view real-time totals and flow rates, input data, and system information
- download data
- access configuration, calibration, and flow run/turbine maintenance menus
- get quick answers to task-specific questions with links to user documents



Controls for all commonly performed tasks are conveniently grouped under four menus near the top of the Main screen. Menus are named for the functions they support: Calibrate Inputs, Maintain Flow Run, Maintain Turbine, or Configure.

Calibrate Inputs Menu

From the Calibrate Inputs menu, a user can calibrate differential pressure, static pressure, and process temperature. The user can load a factory calibration, load a previous calibration, or enter new calibration points.

1 Select the task you want to perform. Then select the parameter you want to calibrate.

2 Click Acquire Point to enter a new calibration point and enter the applied calibration value at the prompt. Or click Load Calibration From... to load the data from a factory calibration or previous calibration.

Click on Change Task to select a new task or a new calibration task.

3 The measured value can be viewed with or without a trend graph. Repeat Step 2 to enter additional calibration points.

4 Click Save Changes to save the New Calibration values to memory.

5 Click Exit Maintenance Mode to resume live data readings.

Applied	Measured	Change (% of FS)
1 0.000	0.783	0.39
2 15.000	15.097	0.05
3 25.000	24.926	-0.04

Live Value	Measured Value
17.578 In H2O	14.973 In H2O

Maintenance Mode

When a user enters a menu in which parameter changes affect volume calculations, the Scanner 2000 is placed in "Maintenance Mode." This locks the input sensor readings at their current values. When the user exits "Maintenance Mode," the inputs are unlocked.

Maintain Flow Run Menu

From the Maintain Flow Run menu, a user can change an orifice plate size, cone meter or averaging pitot tube parameters, cone meter factors, steam properties, or gas composition.

Tasks will vary with the flow calculation method used.

Click Change Task to select a new maintenance task.

1 Select the task you want to perform.

2 Enter new parameters in the fields provided. Or click on Copy From Current to load current parameters.

3 Click Save Changes to save the new parameters to memory.

4 Click Exit Maintenance Mode to resume live data readings.

Maintain Turbine Menu

From the Maintain Turbine menu, a user can change the K-factor or select a different turbine meter.

The user can enter a linear K-factor or a multi-point calibration factor (1 to 12 points allowed).

Click Change Task to select a new turbine meter or a new maintenance task.

1 Select the task you want to perform.

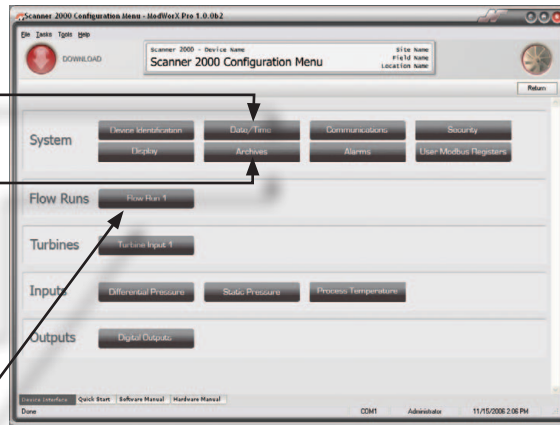
2 Select a new meter or enter a new K-factor using the fields provided.

3 Click Save Changes to save the new selections to memory.

4 Click Exit Maintenance Mode to resume live data readings.

Configure Menu

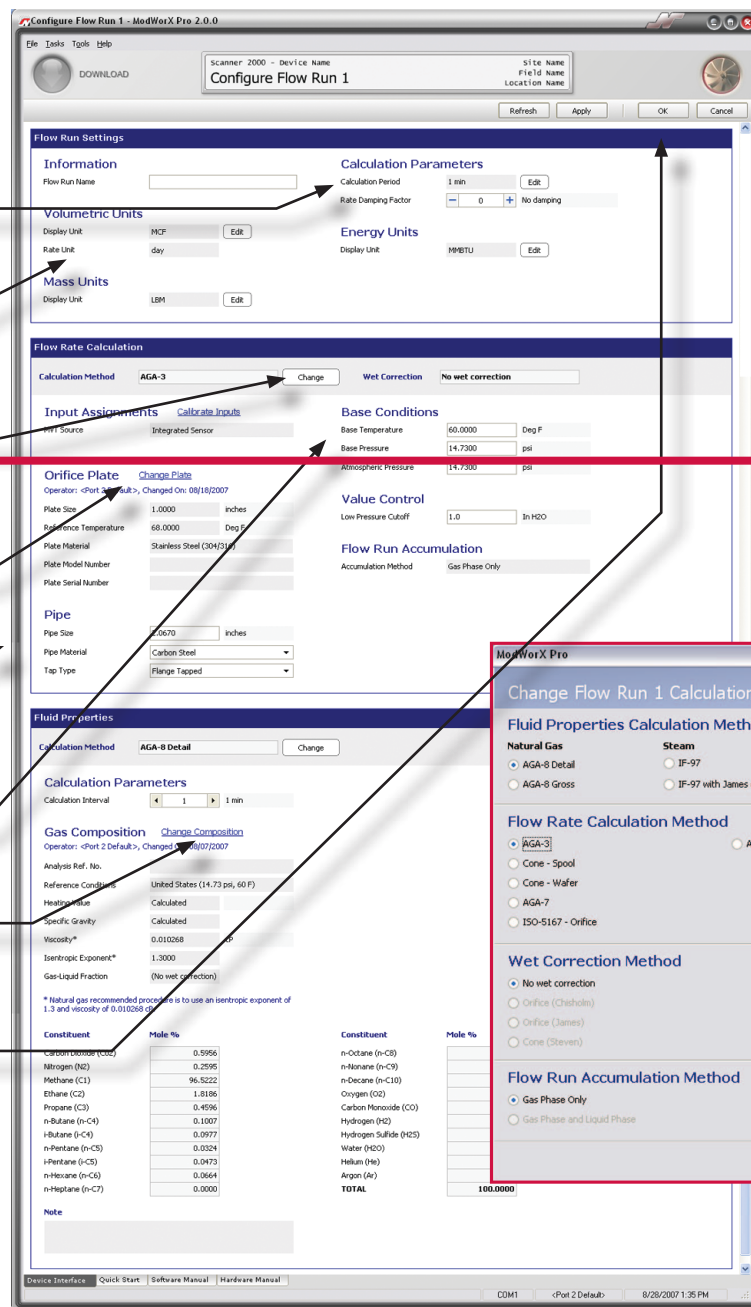
From the Configuration menu (right), a user can access every setting required to perform the initial setup for the Scanner 2000.



The Configure Flow Run 1 screen below shows configuration settings for an AGA-3 gas run. Required parameters will vary, depending on the flow calculation method selected (step 6). For information on configuring a steam flow run, see the ModWorX™ Pro User Manual.

If a liquid turbine input will be used in addition to a compensated gas run, click on Turbine Input 1 for configuration options.

- 1 Set the instrument date and time.
- 2 Establish archive settings
 - parameters to be logged
 - contract hour
 - interval period for saving logs



3 Configure flow run parameters (as shown below).

4 Set the calculation period.

5 Set the units of measurement used for volume and rate.

6 Click "Change" to select the flow calculation method and fluid property calculation method to be used.

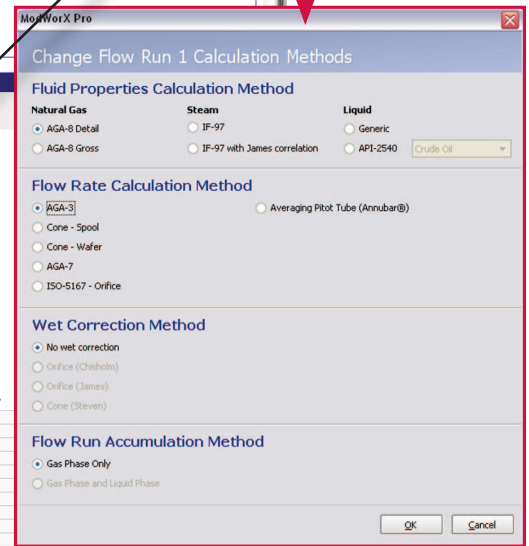
7 Click "Change Plate" to specify plate parameters.

8 Specify pipe parameters.

9 Enter base conditions specific to the location.

10 Click "Change Composition" to specify the gas composition. (Percentages must total 100%.)

11 Click OK to save the new selections to memory.



Download Screens

1 Click on the red Download button to download log data.

2 Select the range of data, the type of logs, and any additional settings to be included in the report. Then click Download Now.



3 Downloaded data will appear in a table as shown. Click one of these buttons to:

- export data
- print the tabular data
- view and/or print a trend graph

Export formats:
 .cfx (Flow-Cal®)
 .ANA, .VOL, and .EVT (PGAS®)
 .pdf, .xls, .rtf, .csv, and .html

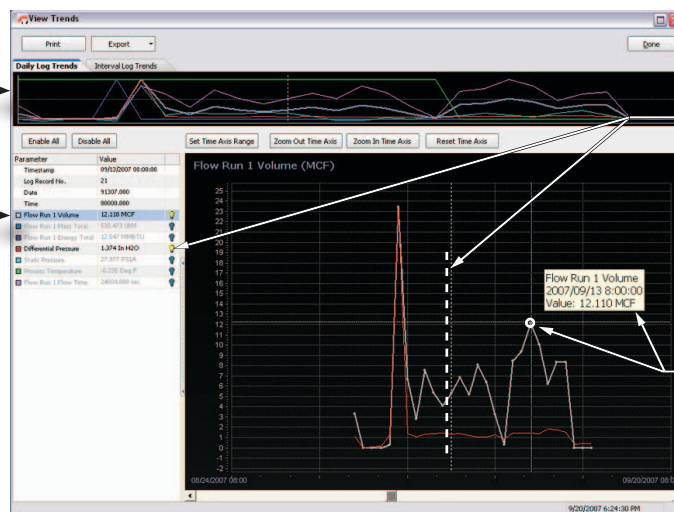
Res	Timestamp	Flow Run 1 Volume	Differential Pressure	Static Pressure	Process Temperature	Flow Run 1 Flow Time	Turbine 1 Volume
72	11/20/2006 10:12:00	0.0000	0.8387	14.3341	52.5551	0.0000	0.0
74	11/20/2006 10:13:00	0.0079	17.3663	14.9355	62.8238	55.0000	0.0
75	11/20/2006 10:14:00	0.1023	18.8329	14.9625	59.5343	60.0000	0.0
76	11/20/2006 10:15:00	0.1022	18.8335	14.9612	59.5186	60.0000	0.0
77	11/20/2006 10:16:00	0.1020	17.9708	14.9588	59.5126	60.0000	0.0
78	11/20/2006 10:17:00	0.1018	17.8819	14.9559	59.5173	60.0000	0.0
79	11/20/2006 10:18:00	0.1015	17.7878	14.9516	59.5263	60.0000	0.0
80	11/20/2006 10:19:00	0.1014	17.7480	14.9499	59.5359	60.0000	0.0
81	11/20/2006 10:20:00	0.1013	17.7401	14.9503	59.5154	60.0000	0.0
82	11/20/2006 10:21:00	0.1014	17.7462	14.9507	59.5219	60.0000	0.0
83	11/20/2006 10:22:00	0.1019	17.9536	14.9582	59.5299	60.0000	0.0
84	11/20/2006 10:23:00	0.1025	18.1590	14.9651	59.5315	60.0000	0.0
85	11/20/2006 10:24:00	0.1027	18.2274	14.9691	59.5243	60.0000	0.0
86	11/20/2006 10:25:00	0.1029	18.2958	14.9727	59.5197	60.0000	0.0
87	11/20/2006 10:26:00	0.1096	20.9338	15.0655	75.5887	60.0000	0.0
88	11/20/2006 10:27:00	0.1325	27.5274	15.3916	48.5634	60.0000	0.0
89	11/20/2006 10:28:00	0.1327	27.5956	15.3839	48.5525	60.0000	0.0
90	11/20/2006 10:29:00	0.1329	27.6632	15.3970	48.5596	60.0000	0.0
91	11/20/2006 10:30:00	0.1332	27.8844	15.3161	48.5637	60.0000	0.0
92	11/20/2006 10:31:00	0.1333	27.8587	15.3122	48.5488	60.0000	0.0
93	11/20/2006 10:32:00	0.1335	27.8381	15.3147	48.5487	60.0000	0.0

To download data, simply press the Download button and select the range and type of files to be downloaded. Daily and interval logs can be viewed or printed as a table or a trend graph.

Each log type and setting type is displayed under a separate tab.

View all downloaded data (gray box shows range of data displayed in bottom graph).

Select the parameter you want to view.



4 The trend view offers two methods of navigation:

(1) Use the scroll bar to move the trend line left or right. The data point that intersects this vertical record index (white dotted) line marks the record being read; the values of all parameters in the record appear in the table at left. Values in the table update automatically as the intersecting data point changes.

(2) Move the mouse to guide the cursor along the trend line. The cursor will snap to the nearest data point. The corresponding parameter, date and time stamp, and parameter value will appear in a pop-up box on the screen.

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