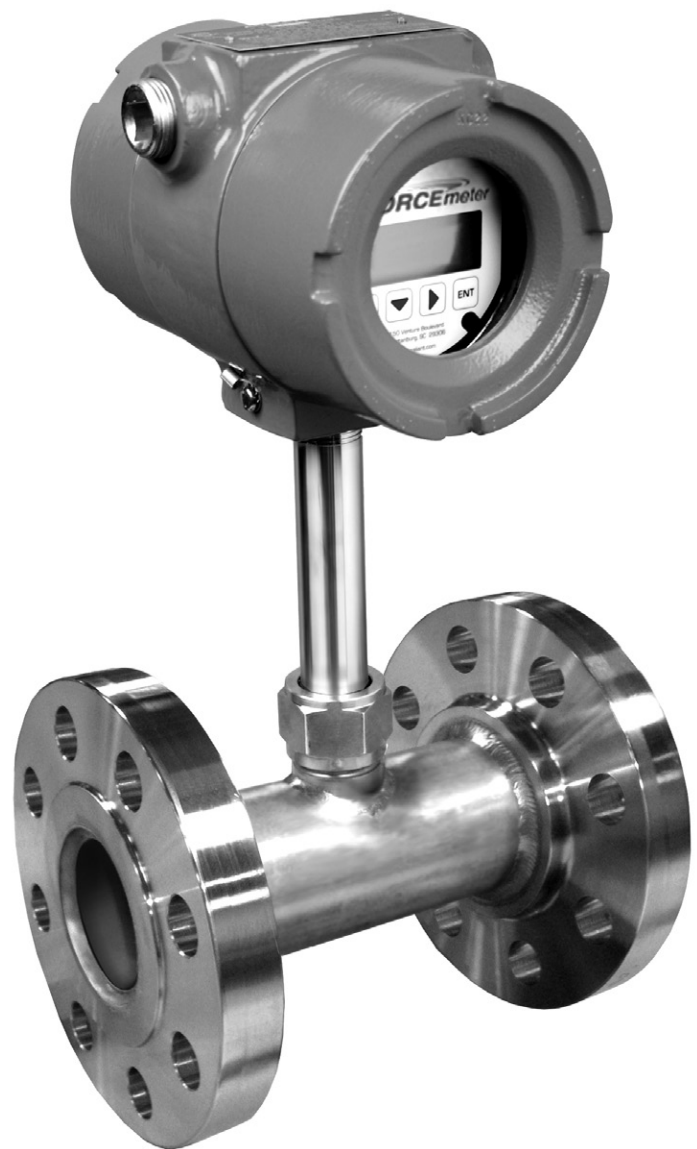




FM Link 1.0 Series Installation & Operation Manual



FORCEmeter™

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This manual is designed to assist in installing, operating, and maintaining the FMLink software used with the ForceMeter™ Two-Wire Transmitter.

SAFETY INFORMATION

Before installing the FMLink software, please read these instructions, and the instructions for the flowmeter and transmitter, to which it will be attached. Familiarize yourself with the requirements and functions. If any questions or problems arise please contact Niagara Meters at (800)778-9251 or www.niagarameters.com.

Ensure that all personnel involved with operating this device are suitably qualified. Observe all local and national electrical codes for the wiring of this device.

NOTE: Manufacturer's instructions and the National Electrical Code (ANSI/NFPA 70) must be followed when installing this equipment. Tampering or replacement with non-factory components may adversely affect the safe use of the system.

CAUTION: DO NOT MODIFY OR CHANGE THIS DEVICE. ANY CHANGES CAN AFFECT PERFORMANCE, VOID WARRANTY, AND CAUSE INJURY OR DEATH.

1.0 DESCRIPTION

FMLink is a Windows-based program for configuration and set-up of the Strain Gage Target Meter Two-Wire Transmitter.

1.1 Hardware Requirements

- HART™ Modem
 - o MicroLink HART™ Protocol Modem USB Interface 101-0007 or equivalent.
 - o MACTek HART™ USB Modem 010031 or equivalent.

These Modems connect to the PC Port on one end, and connect across a 500 ohm resistor in series with the 4-20 mA DC loop on the other. As with all HART™ digital communications, 500 ohm loop resistance is required. The leads of the HART™ Modem are connected across this resistor (see Figure 1).

- PC Requirements:
 - o Requires Windows XP, Windows VISTA or Windows 7 operating system
 - o 40 MB free disk space

2.0 INSTALLATION

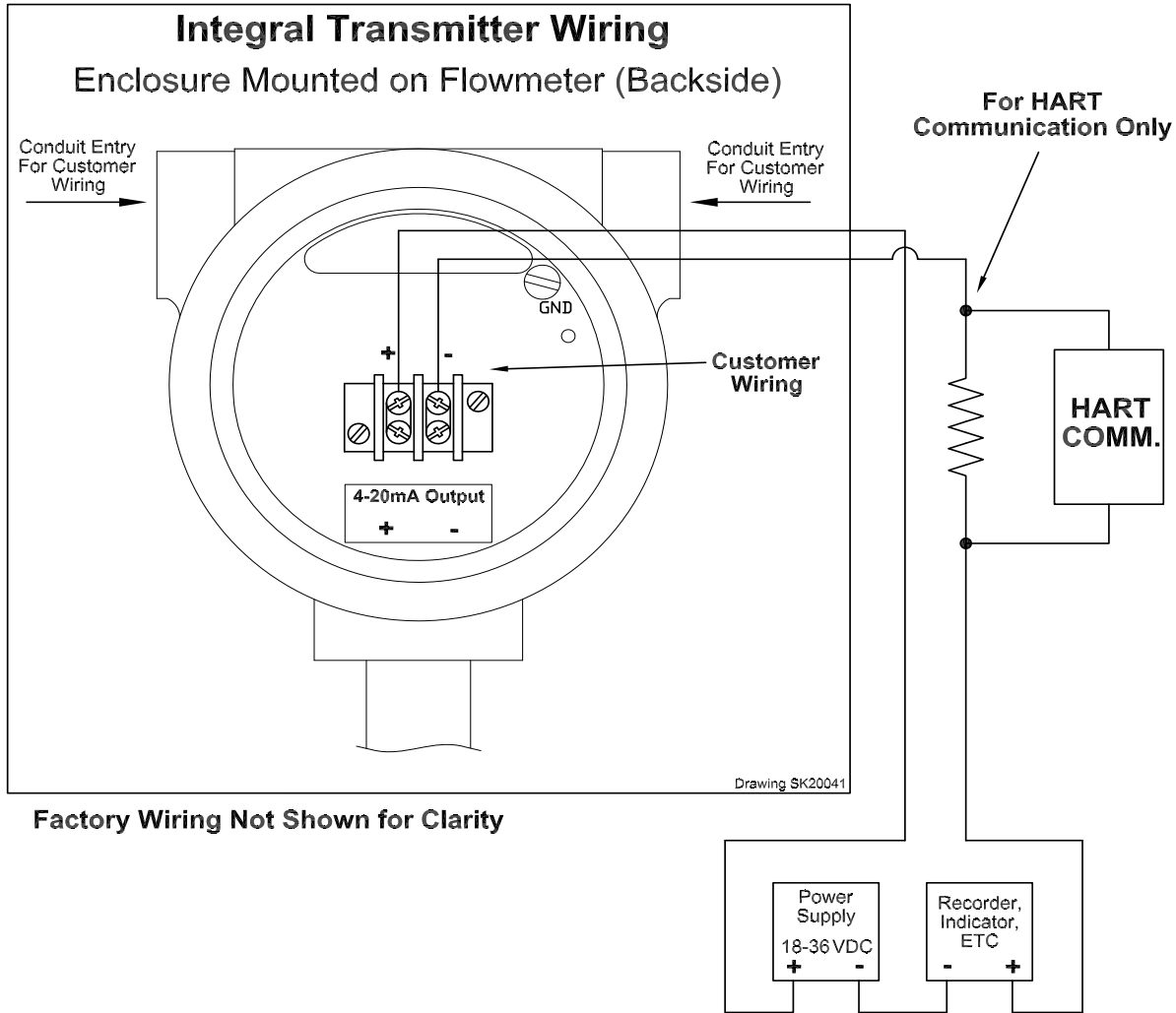
2.1 Software

FMLink software can be downloaded from the manufacturer or by using the installation CD. Follow all on screen options to properly install the software. Once the software is installed then double click on the FMLink icon or program file to open the FMLink window.

2.2 Hardware

Power up the transmitter (24 VDC supply, minimum 100 mA rating) and make the appropriate connections.

Figure 1. Internal Transmitter Wiring



The output terminals marked + and -, are generally connected to a power supply that has a nominal 18 to 36 volt DC voltage and is capable of supplying 100mA for the ForceMeter™. The + and - terminals of the transmitter are connected to the corresponding polarity of the power supply. A load resistor, may be connected in series with either terminal of the transmitter.

Please follow these steps to connect the ForceMeter™ to the HART™ device.

1. 500 ohms must be connected in the loop as shown in diagram above.
2. Connect HART™ modem across load resistor.
3. Connect HART™ modem to computer.
4. Launch FMLink software

5. Select COM port where HART™ modem is connected (Settings tab)
6. Click Connect.
7. FMLink starts communicating with the ForceMeter™ and displays 'Loading Data'
8. If FMLink is unable to communicate with device, check COM port settings and electrical connections.

3.0 OPERATION

Run the FMLink Software.

The FMLink Window will display four tabs across the top:

1. Settings
2. Measurements
3. Functions
4. Calibrations

3.1 Settings Tab

When the program opens it will automatically default to the SETTINGS screen.

The screen will display the COM port settings. FMLink works with 1200 baud rate. Please set COM port as follows:

- REFRESH updates the available COM ports.
- CONNECT allows for connection to be made to the HART™ modem.
- DISCONNECT when communication to the device needs to be terminated for any reason.

Use the COM Port drop-down list to select the port for the HART™ modem.

Once the COM port is selected click CONNECT. A dialog box will appear to confirm that a connection is attempting to be made to the modem and Strain Gage Target Meter, and displays “Loading Data...”. When a successful connection is made all fields on the screen below will be populated.

NOTE: If there is a failure to connect then a dialog box will read “No Response from Device” and the connection settings need to be verified.

3.2 Measurements Tab

NOTE: This screen is a display only, which displays measurement parameters for the Target Meter. If parameters need to be changed then please refer to the CALIBRATIONS Tab section of this guide.

This section displays the 4-20mA value, units used for the flow meter, the current reading on the flow meter, current totalizer values, as well as the current temperature. While FMLink is connected to the HART™ modem, it will read the data from the Target Meter every second, and display it on screen.

mA Value	<input type="text"/>	mA
Flow	<input type="text"/>	
Fwd Totalizer	<input type="text"/>	
Rev Totalizer	<input type="text"/>	
Temperature	<input type="text"/>	°C

The device status section displays the current mode for the Target Meter. If there is a connection problem this will cause the STOP radio button to illuminate.

If a warning or error has been generated then the WARNING or ERROR radio button will be lit and text will appear with the error message. The FUNCTIONS tab can be used to “Clear Faults” and the flow meter will return to RUN mode. **NOTE:** SIMULATE indicates device is in Simulation Mode and will simulate fixed current output.

Device Status

STOP

RUN

SIMULATE

WARNING

ERROR

3.3 Functions Tab

This tab provides five critical functions that allows the user to change the Target Meter configuration data.

- ZERO METER

Select this option to zero the meter. When this button is selected a dialog box will appear to confirm the user would like to zero the meter and the flow meter is ready for zeroing (flow = zero). Choose NO to cancel the selection if for some reason the user is unsure that the meter is ready to be zeroed, otherwise select YES to continue. The meter will zero that current target position. The results of ZERO METER can be confirmed on the MEASUREMENTS Tab.



- RESET TOTAL

Select the RESET TOTAL button in order to reset the total displayed on the Target Meter. When this button is selected a confirmation message will appear to verify the user would like to reset the total on the meter. Press YES to complete the selection or NO to cancel the selection and keep the current total value.

- SIMULATE

Use this selection to simulate a mA value. The pull-down menu will allow user to select from 4mA, 8mA, 12mA, 16mA, 20mA or QUIT. Once a mA selection has been made, press SIMULATE button. The flow meter will simulate this value which can be confirmed by the mA reading on measurement screen. **NOTE:** The flow meter will remain in this mode until the QUIT has been selected.

- RESTORE FACTORY SETTINGS

When this selection is made the system will revert back to the factory defaults that were established in the Target Meter originally from the factory. This can be used if settings have been changed on the CALIBRATION Tab and the Target Meter needs to be restored to Factory settings. The current settings can be confirmed under the CALIBRATION Tab. Once RESTORE FACTORY SETTINGS selection has been made a confirmation dialog box will appear allowing the user to continue or cancel the selection, by selecting YES or NO respectively.

- CLEAR FAULT

Fault messages are cleared by selecting this option. Once the CLEAR FAULTS option is selected the system will clear all active faults, and resume displaying readings if fault issue has been resolved. This can be confirmed on the MEASUREMENTS Tab.

3.4 Calibrations Tab

- CAL VARIABLES

This tab displays the current calibration stored in the meter. Calibration settings are determined by the factory.

NOTE: If a change is made on the screen an (*) will be placed by that variable indicating a change was made. However, this does not change the device settings until a WRITE CALIBRATION has been performed. When variables are returned to their original settings, or WRITE CALIBRATION is performed, the (*) is removed. To re-populate the screen with the current Target Meter settings, select READ CALIBRATION.

CAL Variables

CAL1

CAL2

CAL3

CAL4

CAL5

CAL6

CAL7

CAL8

- TRIM

Use the TRIM section to adjust/tune desired mA values for 4mA and 12 mA. Please consult the Strain Gage Target Meter INSTALLATION AND OPERATION MANUAL for a full description of these settings.

Trim

4 mA

12 mA

- RANGE

The range settings allows user to change flow rate span and cut-off value. 4mA and 20mA range represent the lowest and highest values of a flowrate span in a unidirectional meter. Cut-off is the minimum flow read out. The Max Range is the maximum flow read out for bi-directional meter.

Range

4 mA

20 mA

Cut-Off

Max Range

- MISCELLANEOUS

This section provides CUSTOM SCALE option which allows the flow rate to be set at percentage of actual flow. CUSTOM SCALE ranges from 90% to 110% of flow value. [The DAMPING value determines the amount of damping applied to the flow read out. Higher values increase damping; lower values decrease damping. Damping value can be between 0 to 99.]

Miscellaneous

Custom Scale 90 (90-110)

Damping 1 (00-99)

- METER TYPE

This section provides the option to select the flow type, units measured, as well as the direction of flow. Please consult the Strain Gage Target Meter INSTALLATION AND USER MANUAL for a full description of these settings.

Meter Type

Flow Type

Rate Unit

Total Unit

Meter Direction

- FAILSAFE

This setting provides the option to set the failsafe mA set point. Please consult the Strain Gage Target Meter INSTALLATION AND OPERATION MANUAL for a full description of this setting.

Failsafe

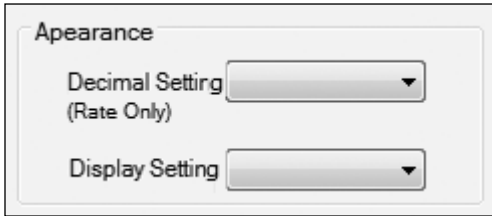
Failsafe Setting

Other Setpoint 20 (4-20 mA)

- APPEARANCE

This setting allows the decimal point setting to be defined and set to the number of decimal digits for the rate display only. Choices are None (0), Single (1) or Double (2).

The two line meter display can be set to display Rate Only, Total Only, or Rate and Total.



At the bottom of the screen these options appear.



- READ CALIBRATION

This selection reads calibration from the Target Meter and populates the CALIBRATION screen. This data represents the real time readings of the Target Meter. Once this selection is made, a dialog box will appear which displays “Reading Calibration”. When this message disappears, the screen will populate with the data from the Target Meter.

- WRITE CALIBRATION

Once selections are made on this screen the user can then WRITE CALIBRATION which will write the current screen calibrations to the meter. A dialog box will appear to confirm the user is prepared to re-calibrate the meter.

- SAVE TO FILE

This option saves the current readings on the calibrations screen to a .CSV file that can be saved in a location on the PC or other storage location. If there is any doubt about whether the current readings on the screen match the meter readings, then select READ CALIBRATION prior to SAVE TO FILE.

- LOAD FROM FILE

This option allows the user to recall any previously saved .CSV files from a stored location and view on the screen. If these readings need to be transferred to the meter then perform a WRITE CALIBRATION to complete this action.

NOTE: Calibrations settings are set by the factory and are customized for that application. Please RESET TO FACTORY DEFAULTS if changes have been made. Please consult factory if any changes need to be performed.

4.0 CALIBRATION

Before proceeding, make sure the following conditions exist:

- DEVICE IS POWERED ON
- NO FLOW IS GOING THROUGH METER
- HART™ MODEM IS CONNECTED AS FOLLOWS:
 - o HART™ modem is connected to the pc.
 - o HART™ modem is connected to device across the loop resistor.
 - o Confirm that correct COM port is selected on pc for HART™ modem.

4.1 Save Calibration

- a. Open FMLink software.
- b. Select the COM port where HART™ modem is connected.
- c. Select CONNECT. FMLink will download data from device.
- d. Once download is complete, go to Calibration Screen and select SAVE TO FILE.
- e. Save calibrations as *.csv file. Include meter information in file name for future reference, i.e. serial number, date or model.

Read Calibration

Write Calibration

Save To File

Load From File

Set To Default

4.2 Transfer Previous Calibration to Device

- a. Open FMLink software.
- b. Select the COM port where HART™ modem is connected.
- c. Select CONNECT. FMLink will download data from device.
- d. Once download is complete, go to Calibration Screen and select LOAD FROM FILE.
- e. Load calibrations from *.csv file. Confirm your selection.
- f. Once calibrations are loaded, select WRITE CALIBRATION.
- g. Allow 30 seconds for calibration to write into device.
- h. Once calibrations are written to device, verify changes on measurement screen.

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