Interface Software Kit

User Manual
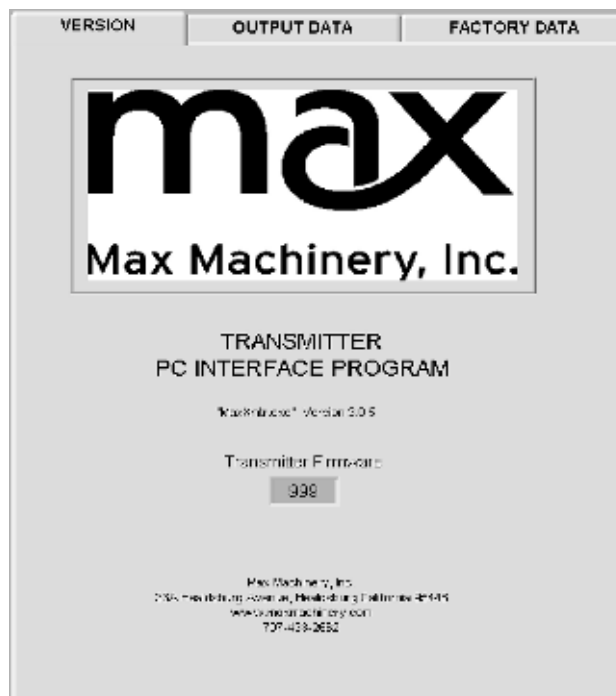
Version 3.0.5

Overview

The interface software kit allows you to adjust the settings of your Max Model 29x Series transmitters. The following settings can be modified: Pulse Output Scaling, Analog Output Limits and Scaling, Signal Filtering Options and Compensation settings.

The interface software kit is available for purchase as part number SFT-KIT-001 and includes the installation USB drive and the cables to connect the transmitter to the USB or serial port of a PC.

Software Installation

This program is built off Labview's runtime library. It is designed for Windows 2000, Windows XP, Vista, Windows 7, Windows 8.1, and Windows 10. A minimum of 256 MB of RAM, at least 700 MB of available disk space, and a screen resolution of at least 1024 x 768 pixels is required.

Remove old versions of the Max Transmitter and runtime library programs before installing the latest version:

- Click on Start, Type "add remove" and select Add/Remove Programs from the search results list..
- Find either Max294 or MaxXmtr and click on it.
- Click on Remove and follow the on screen instructions.
- To remove the National Instruments runtime components, select National Instruments Software, Click on Remove and at the pop up window select Ni-Visa Runtime and Remove.

Install the latest version of this program

1. Disable any automatic virus detection programs and exit all applications before running this installer.

2. Insert the Max USB drive and follow the instructions on the screen.

3. Insert installation drive into an available USB port. Once you open up the drive click setup.exe, and follow on-screen instructions.

4. After installation is complete, re-enable any virus detection programs you disabled.

5. To run the Serial Interface Program, press Start, All Programs, then click on MaxXmtr\MaxXmtr.

6. If any problems occur, reboot, and follow the removal instructions above. Then reboot and attempt the install again. If the problem persists, please contact Max Machinery.

Install the Driver for USB to Serial Adapter

If your computer does not have a serial port, use the USB adapter provided in your kit. DO NOT plug in the adapter before installing the software.

Complete the following steps to install the USB Adapter:

1. Open windows explorer and go to the install USB and open the folder 'USB to Serial Adapter'.

2. A detailed installation guide is provided -- 'PL2303 Windows Driver User Manual v1.10.0.pdf'.

2. Double Click on the file 'PL2303_Prolific_DriverInstaller_v1.10.0.exe' to start the installation.

3. Follow the prompts and then plug in the Adapter when the install is completed.

Adjusting Max Transmitter Settings with Interface Software

1. Remove the lid of the transmitter to reveal 1/8" serial port. See the transmitter's user manual for assistance.

2. Insert the 1/8" serial plug into the connector on the transmitter circuit board.

3. Connect the serial cable to the serial port on the PC. If your computer does not have a serial port, use the USB to serial adapter. The USB to serial adapter driver software must first be installed. Refer to the section above "Install the Driver for USB to Serial Adapter" or the "Readme" file on the USB drive before using the USB adapter.

4. Ensure the transmitter is powered up. Launch the Interface Software Program by either selecting MaxXmtr from the start menu or by double-clicking the MaxXmtr executable located in the installation directory.

A dialog box will prompt the user to select the serial port. Choose the port with the connected serial interface cable and press Continue.

If the transmitter is not detected, an error message is displayed. Verify the transmitter is connected to the serial cable and powered up, then press Retry. A red or green LED will be lit on the transmitter circuit board if it has power.

If the wrong serial port is selected, close and restart the MaxXmtr program with the correct serial port selected.

If you are using an analog output transmitter, beware of grounding problems between the transmitter and a laptop computer. If the output signal jumps to full scale when the connection is made, switch to battery power and unhook your laptop charger.

If the connection is not successful, contact Max Machinery, Inc. for assistance.

Once serial communication is established, the program automatically reads the transmitter data and displays the firmware version on the Information screen.

Program Compatibility

This program is designed to work with all current and previous versions of the Max Model 29x Series transmitters.

Interface Simulator Mode

A simulation mode may be accessed by starting the program without a connection to a physical transmitter. When prompted to select a serial port, choose any unused port and when prompted by **Transmitter Not Detected**, select Cancel. Then select OK to run in simulator mode. This allows you to tryout the functionality of both pulse and analog transmitters without needing to physically connect to a transmitter.

Output Data Screen

The Output Data tab provides access to the most commonly adjusted parameters for the transmitter.
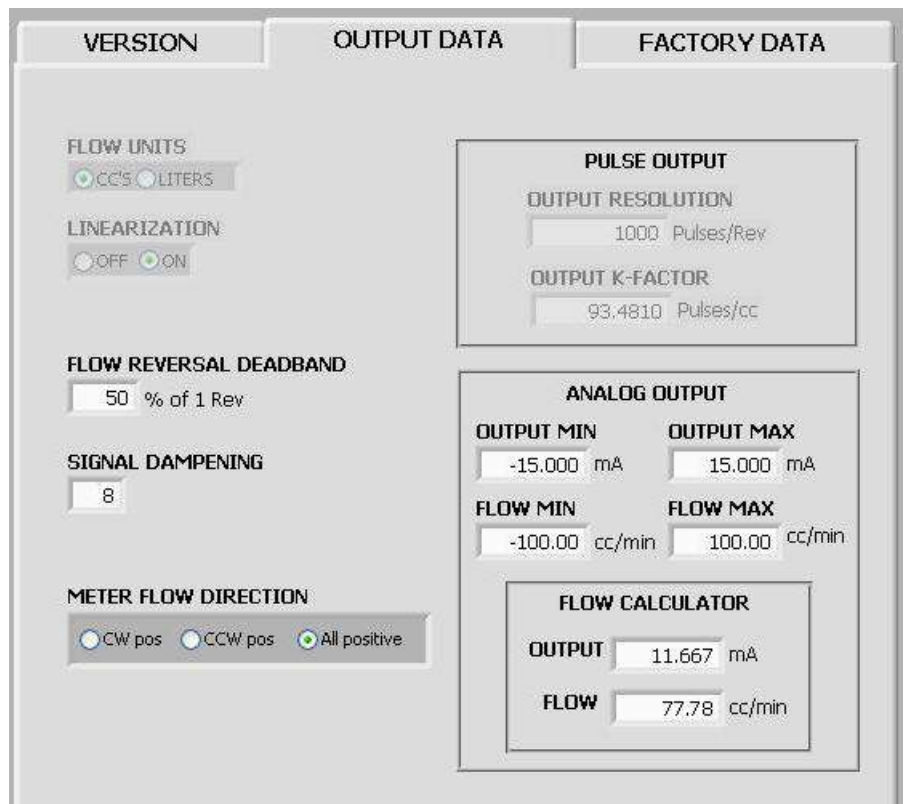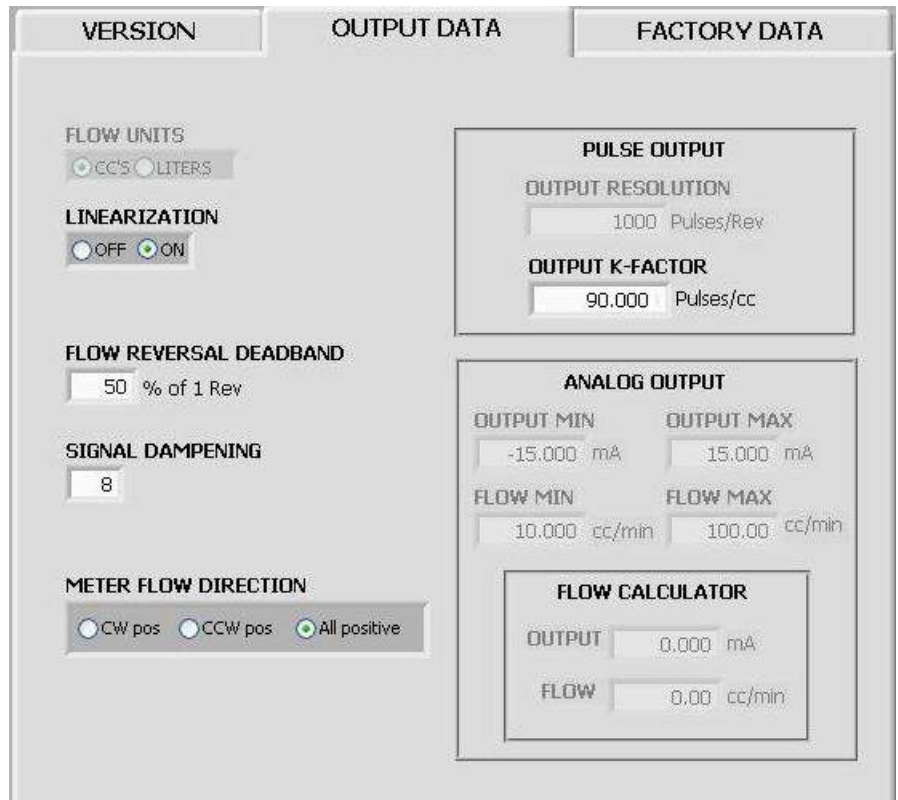
Linearization On/Off

This feature corrects for mechanical non-linearity of the meter to produce an output signal that is precisely proportional to flow. Typically the only reason to turn off linearization is to collect the calibration data with which to populate the linearization table on the factory data tab.

Note: On analog transmitters this feature cannot be disabled.

Pulse Output

With linearization enabled, the meter's output can be set to a precise Output K-Factor where each pulse represents a fixed volume. This allows the user to take several meters and set them all to an exact scaling. With Linearization off, you are able to set a fixed number of pulses per revolution of the meter.

Note: For quadrature output transmitters, the output K-Factor shown is the output on one of the channels (phase A OR phase B) however the meter's total resolution is the total number of pulses output on both channels (phase A PLUS phase B).

Flow Units

This field shows the units used for the Transmitter Output Settings as well as the Linearization Data stored on the transmitter.

Analog Output

This sets both the output limits and the output scaling. Voltage transmitters can be set anywhere between -10V and +10V, and current transmitters within the range of -20 mA to +20 mA. Because the transmitter receives a 2 stage calibration at the factory, it is possible to change the analog scaling at any time without loss of accuracy or need to re-calibrate. Note that the minimum and maximum output values are hard limits that the transmitter output will not exceed. The Flow Minimum and Flow Maximum can be set to any desired measurement range both negative and positive. The output span can even be set to a tight band such as 200 ccm minimum and 250 ccm maximum if you want very high resolution and have a specific flow range that you are measuring.

Flow Calculator

This is a tool to allow the user to run sample values of either the flow rate or the output value. After entering one field, the alternate field is then calculated based on the chosen analog scaling.

Meter Flow Direction

This field is set by the factory based on the mechanical design of each meter (CCW = counter clockwise, CW=clockwise). If the meter is installed backwards for any reason, this field can be switched to correct any sign reversal. If bidirectional measurement is not needed, this may be set to **All Positive**.

Flow Reversal Dead Band

On meters with unidirectional output, there is risk that momentary reverse flow will be output as if it was positive flow. To prevent this, the transmitter can be programmed with up to 100% of one meter revolution to act as a dead band. For example, if your setting is 50%, any flow reversal that does not cause the meter to turn more than 1/2 of a revolution in the reverse direction will be buffered and only net forward flow will be counted. If the meter turns more than the dead band amount in the reverse direction, the meter will then report positive output based on unidirectional flow calibration data.

Default Flow Reversal Settings:
Unidirectional configurations – 50%
Bidirectional configurations – 0%

Output Signal Damping

This feature sets the time constant/cut-off frequency used to filter the raw flow signal. Selecting zero provides the minimum amount of filtering and the fastest response at the cost of increased noise. The zero setting can be useful if sudden flow changes need to be measured, or if filtering will be added after measuring the signal. The time constants and equivalent cut-off frequency for each type of meter are as follows:

Default Damping Settings:
Unidirectional configurations – 5
Unidirectional configurations – 7 (P234 model only)
Bidirectional configurations – 0

Pulse Output chart

Filter Setting	0	1	2	3	4	5	6	7	8	9
Time Constant (ms)	0.5	0.6	1.7	3.7	7.8	15.6	31.3	62.5	125	250
Cut-off Frequency (Hz)	2000	1700	600	270	128	64	32	16	8	4

Analog Output chart

Filter Setting	0	1	2	3	4	5	6	7	8	9
Time Constant (ms)	1.7	3.7	7.8	15.6	31.3	62.5	125	250	500	1 sec
Cut-off Frequency (Hz)	600	270	128	64	32	16	8	4	2	1

Analog Output chart (continued)

Filter Setting	10	11	12	13	14	15
Time Constant (ms)	2 sec	4 sec	8 sec	16 sec	32 sec	64 sec
Cut-off Frequency (Hz)	0.5	0.25	0.125	0.062	0.031	0.015

Read and Write to Transmitter

These two buttons allow for reading from or writing to the transmitter. After entering new data into any of the fields, a **Data Changed** prompt will be displayed. If you wish to save any entries or selections you have made, you must download those new settings into the transmitter by pressing the **Write to Transmitter** button. To discard changes you can select **Read from Transmitter** to again upload what is in the transmitter memory.

Factory Data Screen

The Factory Data tab shows calibration settings that generally will only need to be set at the factory. Most fields are password protected. If needed, contact the factory for details.

Compensation Options

Compensation is a software feature where the transmitter measures the rotational speed of the meter thru one complete revolution, and then corrects for this variation. Because different mechanical meters contain design differences resulting in cyclic speed variation, this process is able to smooth out this cyclic error without adding any signal filtering. Note that it is critical that a constant flow is passing thru the meter when this compensation is done so that only mechanical variation is mapped by the transmitter.

Restore Factory

This option restores the compensation table to the values that were originally learned at the factory. Generally used after a field compensation yields poor results.

Disable

This turns off the cyclic compensation and is only recommended for a field replacement transmitter when a steady flow is not available to perform a field compensation.

Perform Field

This option characterizes the flow meter and sensors at a steady flow rate to provide optimal spacing of the output pulses. Use when optimal output response is needed, Factory Compensation is not available, or the application is very low flow or high viscosity fluid.

Note: You must have a steady flow during compensation.

Perform Factory

The option is used only by the factory for initial compensation.

Requirements for Field Compensation

Recommended Meter RPM	15 - 1000
Minimum Acceptable RPM	10 (LOW FLOW error displayed if lower)
Maximum Acceptable RPM	1350 (HIGH FLOW error displayed if higher)
Maximum Allowable Flow Ripple	3% (or UNSTEADY FLOW error displayed)

Activating Selected Compensation

After selecting the desired compensation option, the **Proceed with Option** button must be pressed. This initiates the compensation, during which the Status Bar will turn yellow (In Progress, may take up to 1 minute). Upon completion, the Status Bar will turn grey and display the results of the compensation.

Linearization Data

The displayed values are from the Raw Factory Calibration of a flow meter. They are NOT the values shown on the Calibration Certificate provided with the flow meter. Typically, the linearization table is programmed into the transmitter/meter assembly at the factory and will not need to be modified by the user, except in the following cases:

a) After performing a field calibration of the flow meter.

b) During a field replacement of the transmitter where the customer wishes to enter the linearization data. In this case you must request the Raw Factory Calibration Report be sent to you for the flow meter (the flow meter serial number is required) or note the values entered into the original transmitter's linearization data fields. The factory can also load K-factor data into a replacement transmitter before shipment.

Analog Calibration

This data is collected on analog transmitters using high accuracy measurement equipment and provides precise calibration of the onboard circuitry.

Note: Do not make changes in this area. A loss of "cal" and "result" data will shut off the analog output signal.

Contact Us

If you need further assistance, go to www.maxmachinery.com or call 707.433.2662.

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