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Introduction

The ST80/ST80L Configuration software is a Windows PC application that lets you easily set up and configure the ST80/ST80L thermal mass flow meter. Use this tool for all instrument commissioning activity. Note that the software application serves both ST and MT series product lines. This manual, however, covers operation with ST80/ST80L only (software version 3.2.0.x).

Installation

Find the Software Configurator MSI install file in the Software folder on the product documentation CD or downloaded over the web. The file can be identified by name: ST-MT-Configurator-v3200.msi. Copy this file to a location on your PC designated for ST80/ST80L documentation.

Run the MSI installer file (make sure you have administrative rights to install) and follow the on-screen instructions to complete the installation (uninstall any previous version of the software first). The installation process places an application shortcut icon of a stylized meter face on the Windows desktop: The installer also creates a folder in the Start Menu named Fluid Components Intl, which contains another program shortcut.

Running the PC Configuration Application

Connect the host PC via USB:

- Connect the instrument to the PC USB port using the USB cable provided. Remove the instrument’s blind lid and plug the cable end with the square-shaped plug into the instrument’s Type B USB connector J21. Locate this connector at the bottom edge of the main board as shown in the figure below. Plug the other end of this cable (flat plug) into the PC’s USB port

![USB Type B Connector, J21](image)

Figure 1 – USB Connector on ST80/ST80L Main Board (Blind Lid Removed)

**Note:** To avoid any connection problems make sure the ST80/ST80L is fully booted before connecting to the PC USB port and/or launching the ST80/ST80L configuration software.

**Caution:** A host PC connection to the ST80/ST80L is intended for temporary use only. Do not make the PC/network connection part of the permanent installation.
Double click the ST80/ST80L Configurator icon. The application opens to the Welcome screen as shown in the figure below. Click USB Connect (Ethernet Connect does not apply to ST80/ST80L) at the top of the screen to let the PC communicate with the instrument (with cable connection already made).

Figure 2 – Welcome Screen

Once connected, the application window shows the Process Data screen as shown in the figure below. The displayed information, which is the same as that shown on the HMI front panel display, includes the following:

- Flow as percent of range (scale)
- Flow with engineering units
- Total Flow (if Mass or Volumetric units used)
- Temperature
- Calibration Group number and Group name
- Alarm/Fault indicators
Configuration Software Basics

The ST80/ST80L is set up using a configuration menu arranged in a hierarchical tree structure on the left side of the window. Select a menu item to see the related tabs on the right side of the window. Within the tab area parameter data is typically organized into one or more data fields, which are set off with a thin divider line or a thin box outline.

Many screens show Get from Device and/or Send to Device buttons at the bottom portion of the window. These buttons are shown if the window tab includes parameter data that can be retrieved from the instrument for display (Get from Device) and/or transmitted to the instrument for programming (Send to Device). The Send to Device button is normally grayed out (inactive) initially until a change is made in a data field. Once a parameter change is detected, the Send to Device button becomes active as shown by its solid appearance.

Click Disconnect to break the connection between the PC and ST80/ST80L. Click the application window Close button or type ALT+F4 (with the application window having the focus) to quit the application altogether.

Note: Once the PC’s configuration software is communicating with the instrument, some HMI display items/menus are inactive due to control being handed over to the configuration application. For example, front panel selection of groups via the MENU button is inactive (inactive HMI display menu items are shown with an asterisk).

Password Protection

To protect against unwanted/unauthorized change, two levels of password protection are provided: User and Factory. The User level password is associated with common user-accessed parameters that can only be changed after entering the User password. The Factory level password is associated with more sensitive programming that can only be modified by the factory or its representatives. The dialog box for password entry is shown below. When prompted, type the password and then click OK. The User password is: 2772. The password is also shown in this manual with the tab summary tables.
Basic Setup Tab Screens

Select the Basic Setup branch on the menu tree to access basic setup items. The Groups tab is the first of several tabs across the top of the screen. Each tab provides a particular menu within the Basic Setup branch.

![Groups Tab Example](image)

Figure 5 – Example Groups Tab (Basic Setup)

The table below summarizes the tabs within the Basic Setup branch.

<table>
<thead>
<tr>
<th>Tab Name</th>
<th>Tab Description</th>
<th>Password Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>Select and name groups. Switching between established groups takes place immediately once the radio button is clicked (no password required).</td>
<td>User</td>
</tr>
<tr>
<td>Units</td>
<td>Select flow and temperature units.</td>
<td>User</td>
</tr>
<tr>
<td>Pipe Size</td>
<td>Select pipe type and dimensions.</td>
<td>User</td>
</tr>
<tr>
<td>Alarms</td>
<td>Select and set alarm requirements.</td>
<td>User</td>
</tr>
<tr>
<td>Totalizer</td>
<td>Select and reset Totalizer requirements.</td>
<td>User</td>
</tr>
<tr>
<td>Display Settings</td>
<td>Adjust the HMI display. Tick the “Rotate Display 90 Degrees Clock-wise” box and then click Send To Device to rotate the display 90 degrees (repeat as required). Move the Display Contrast slider as required (left = min.; right = max.) and then click Send to Device to change the display contrast.</td>
<td>User</td>
</tr>
</tbody>
</table>

[User password 2772]

To verify the current configuration of any setup parameter, click Get from Device on any of the Setup menus. After changing any of the setup parameters, click Send to Device. Click Get from Device again to verify the parameter(s) change. Observe that the changed parameters are now displayed. The remaining Basic Setup tab screens are shown below.
Figure 6 – Example Units Tab (Basic Setup)

Figure 7 – Example Pipe Size Tab (Basic Setup)

Figure 8 – Example Alarms Tab (Basic Setup)
Figure 9 – Example Totalizer Tab (Basic Setup)

Figure 10 – Example Display Settings Tab (Basic Setup)
Advanced Setup Tab Screens

Select the Advanced Setup branch on the menu tree to access advanced setup items. The User Parameters tab is the first of several tabs across the top of the screen. Each tab provides a particular menu within the Advanced Setup branch.

The table below summarizes the tabs within the Advanced Setup branch.

### Table 2 – Advanced Setup Tabs

<table>
<thead>
<tr>
<th>Tab Name</th>
<th>Tab Description</th>
<th>Password Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Parameters</td>
<td>Shows min/max process variable limits and K Factor.</td>
<td>User</td>
</tr>
<tr>
<td>Date and Time</td>
<td>In the Date and Time field, set the date using the drop down calendar date picker and the time using the spinner controls. Alternatively, click Set to System Date/Time to copy the host PC system’s date/time and transmit it to the instrument’s battery-backed real time clock.</td>
<td>User</td>
</tr>
<tr>
<td>Download Calibration</td>
<td>Lets users download a full calibration to their ST80/ST80L via a text file. Contact FCI to obtain the .txt file that was generated by the factory linearization software (Cal2). See “Download Calibration” on page 8 for details on how to download the calibration file.</td>
<td>User</td>
</tr>
<tr>
<td>Reboot Device</td>
<td>Click Reboot Device to perform a warm boot of the ST80/ST80L. Be aware that rebooting the instrument affects device outputs and interrupts communications.</td>
<td>User</td>
</tr>
<tr>
<td>Flow Filtering</td>
<td>Sets flow filtering via Flow Output Damping(^1) and/or Flow Input Moving Average Filter(^2). Refer to Flow Filtering in main manual 06EN003490 for details on these features.</td>
<td>User</td>
</tr>
</tbody>
</table>

Note 1. Flow damping smooths out flow signal output. Flow response is reduced with high flow damping values.

Note 2. The flow input moving average filter smooths out the input flow signal using a moving average (boxcar) filter that averages the last \(X\) number of readings.

To verify the current configuration of any setup parameter, click Get from Device on any of the Setup menus. After changing any of the setup parameters, click Send to Device. Click Get from Device again to verify the parameter(s) change. Observe that the changed parameters are now displayed. The remaining Advanced Setup tab screens are shown below.
Download Calibration

Follow these steps to download the calibration file directly to the instrument.

1. In the Get Calibration File field, click Browse...
2. Observe that an Open File dialog appears. Navigate to the Cal2-generated text file’s directory/folder (local drive or network), select the appropriate file, and then click Open. Observe that the text box shows the file’s path.
3. In the Select Group For Download field, use the drop down list to select the applicable group.
4. In the Select FE For Download field, use the drop down list to select the FE (FE1 is the only choice for ST80/ST80L).
5. Click Send to Device (enter User password as required).

Note: The calibration file is a text file with the following default filename format:

SerialNo_CustomerNo_CalGroup_FE/Head.txt.

Example: For an instrument with serial number 492890, customer number C076370, calibration group 1, and a single FE/head, the calibration file filename would be: 492890_C076370_1_1.txt.
Figure 14 – Example Reboot Device Tab (Advanced Setup)

Figure 15 – Example Flow Filtering Tab (Advanced Setup)
Configuration Tab Screens

Select the Configuration branch on the menu tree to access configuration setup items. The Output tab is the first of several tabs across the top of the screen. Each tab provides a particular menu within the Configuration branch.

![Example Output Tab (Configuration)](image)

The table below summarizes the tabs within the Configuration branch.

<table>
<thead>
<tr>
<th>Tab Name</th>
<th>Tab Description</th>
<th>Password Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>Sets: 4-20 mA channels parameter and units assignment, and digital bus selection (Modbus or FF/Proﬁbus).</td>
<td>User</td>
</tr>
<tr>
<td>4-20 mA User</td>
<td>Manual mA Output loop check; configure/enable NAMUR fault. Note that an analog output must be set to Flow (in Output tab) for NAMUR parameters (including enable/disable checkbox) to display for that channel.</td>
<td>User</td>
</tr>
<tr>
<td>Modbus</td>
<td>Sets Modbus communication parameters.</td>
<td>User</td>
</tr>
<tr>
<td>AST Power Mode</td>
<td>Sets heater mode (AST or Constant Power) and max. heater current for AST (90 mA or 105 mA). The max. current value forms the threshold at which the instrument transitions to/from Constant Power mode. See Configuring for AST™ or Constant Power Measurement Methods in the Operation section of main manual 06EN003490 for more information. Note that VC and VD data is for factory use only.</td>
<td>User</td>
</tr>
</tbody>
</table>

Note 1. To set HART operation, select HART Flow from 4-20 mA #1 drop-down list (in Analog Output Selection field).

Note 2. Digital busses (includes HART, Modbus, and FF/Proﬁbus) are mutually exclusive, meaning only one can be active at a time. Attempting to enable HART when Modbus or FF/Proﬁbus is in effect causes the Digital Bus Deactivation Warning dialog to display: Click OK to make the change and force the Digital Output Selection to None or click Cancel to leave the setting unchanged. Attempting to enable Modbus or FF/Proﬁbus when HART is in effect causes the HART Deactivation Warning dialog to display: Click OK to make the change and force the 4-20 mA #1 Selection to Flow or click Cancel to leave the setting unchanged.

[User password 2772]

To verify the current configuration of any setup parameter, click Get from Device on any of the Setup menus. After changing any of the setup parameters, click Send to Device. Click Get from Device again to verify the parameter(s) change. Observe that the changed parameters are now displayed. The remaining Configuration tab screens are shown below.
Figure 17 – Example 4-20 mA User Tab (Configuration)

Figure 18 – Example Modbus Tab (Configuration)

Figure 19 – Example AST Power Mode Tab (Configuration)
Diagnostics Tab Screens

Select the **Diagnostics** branch on the menu tree to access diagnostic items. The **Status** tab is the first of several tabs across the top of the screen. Each tab provides a particular menu within the **Diagnostics** branch. The table below summarizes the tabs within the **Diagnostics** branch.

<table>
<thead>
<tr>
<th>Tab Name</th>
<th>Tab Description</th>
<th>Password Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status</strong></td>
<td>Indicates system status and fault flags. Click <strong>Get Status from Device</strong> to display the status.</td>
<td>Read only</td>
</tr>
<tr>
<td><strong>Fault Log</strong></td>
<td>Shows fault history. Click <strong>Get Fault Logs from Device</strong> to list the faults in the scrollable text box. Click <strong>Clear Fault Log</strong> to clear the log.</td>
<td>User</td>
</tr>
<tr>
<td><strong>idR Scheduled Tests</strong></td>
<td>For internal Delta R (idR) resistance check – Set pass/fail criteria, set FE1 output mode during test, schedule periodic idR test, display previous idR test results, and start idR test on-demand. Test results display in <strong>FE1 idR Test Results</strong> field (table format) when done. See Running the idR Check Using the ST80/ST80L Configuration Software in the Operation section of main manual 06EN003490 for more details on this screen.</td>
<td>User</td>
</tr>
<tr>
<td><strong>idR Test Logs</strong></td>
<td>Click <strong>Get Test Log from Device</strong> to show idR test results in the scrollable text box. Click <strong>Clear Test Logs</strong> to clear the log.</td>
<td>User</td>
</tr>
<tr>
<td><strong>Heater Values</strong></td>
<td>Shows heater status for the selected FE. Data shown includes heater resistance, heater voltage, and heater current (in mA). Click <strong>Start Data Loop</strong> to start the measurements for heater status. Note that status data does not show until <strong>Start Data Loop</strong> is clicked. Click <strong>Stop Data Loop</strong> to stop the heater status updates. Also, moving to another tab clears heater status data (if returning to the <strong>Heater Values</strong> tab, click <strong>Start Data Loop</strong> to redisplay heater status data).</td>
<td>User</td>
</tr>
</tbody>
</table>

[User password 2772]

The remaining **Diagnostics** tab screens are shown below.
Figure 21 – Example Fault Log Tab and Example Fault Log List (Diagnostics)

Figure 22 – Example idR Scheduled Tests Tab and Example idR On-Demand Test Results Display (Diagnostics)

Figure 23 – Example idR Test Logs Tab and Example idR Test Log List (Diagnostics)
Factory Tab Screens

The **Factory** branch on the menu tree provides factory-only setup items. Only the factory or its representatives can change data in this group.

**Table 5 – Factory Tabs**

<table>
<thead>
<tr>
<th>Tab Name</th>
<th>Tab Description</th>
<th>Password Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory Parameters</td>
<td>Factory use only. (Calibrated Min/Max data.)</td>
<td>Factory</td>
</tr>
<tr>
<td>Identification</td>
<td>Factory use only. (Instrument ID data.)</td>
<td>Factory</td>
</tr>
<tr>
<td>4-20mA Factory</td>
<td>Factory use only. (4-20 mA output DAC count scaling and manual output control.)</td>
<td>Factory</td>
</tr>
<tr>
<td>Options</td>
<td>Factory use only. (Option inventory: display configuration, FE configuration [Fixed at FE1 for ST80/ST80L].)</td>
<td>Factory</td>
</tr>
<tr>
<td>HART</td>
<td>Factory use only. (HART ID info: electronics revision, HART ID, int. HART rev.)</td>
<td>Factory</td>
</tr>
<tr>
<td>Memory</td>
<td>Factory use only. (Erase various memory spaces.)</td>
<td>Factory</td>
</tr>
<tr>
<td>Reset idRs</td>
<td>Factory use only. (Click Run FE1 idR Check for selected FE [fixed at FE1 for ST80/ST80L], and then click Reset Expected idR Values to set displayed Measured Ohms values as new baseline for Expected Ohms values [observe that values in the Internal dR Check Values field disappear after Reset Expected idR Values is clicked].)</td>
<td>Factory</td>
</tr>
<tr>
<td>SIL Adj</td>
<td>Factory use only. (Adjusts calibration for accurate reading of power supply voltages [+24 VDC, +5 VDC] and 4-20 mA Output #1.)</td>
<td>Factory</td>
</tr>
<tr>
<td>FE Faults</td>
<td>Factory use only. (Click Get Current FE1 Faults to display all possible FE faults with enable and/or trip status. In the screen’s Enabled column, make any fault enable/disable change by checking (fault enabled) or unchecking (fault disabled) the box and then clicking Send FT Enabled Map Changes [requires Factory level password].)</td>
<td>Factory</td>
</tr>
<tr>
<td>Core Faults</td>
<td>Factory use only. (Click Get Current Faults to display all possible core faults with trip status. The Core Faults screen shows Pressure Data Fault as tripped by default. This is normal since the ST80/ST80L is not pressure-capable.)</td>
<td>Factory</td>
</tr>
</tbody>
</table>
Figure 25 – Example Factory Parameters Tab (Factory)

Figure 26 – Example Identification Tab (Factory)

Figure 27 – Example 4-20mA Factory Tab (Factory)
Figure 28 – Example Options Tab (Factory)

Figure 29 – Example HART Tab (Factory)

Figure 30 – Example Memory Tab (Factory)
Figure 31 – Example Reset idRs Tab (Factory)

Figure 32 – Example SIL Adj Tab (Factory)

Figure 33 – Example FE Faults Tab (Factory)
ST80/ST80L Configuration Software

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**FE1 Process Data**

Select the **FE1 Process Data** branch on the menu tree. The figure below shows an example FE1 Process Data screen. This screen displays the real time values of the following flow element parameters:

- Reff – Reference RTD resistance
- dR – Delta resistance between the active and reference RTDs
- dTdT – Delta-T/Delta-R resistance, variable relative to process flow rate
- Temperature – Real time temperature value
- Flow – Real time flow value

This screen can be helpful when diagnosing system faults.
Parameter Reports

A Parameter Reports screen (under Group Parameters in the menu tree) displays the calibration and configuration information saved in the ST80/ST80L unit for a particular calibration group numbered 1-5. Selecting a parameter report for a particular calibration group displays that group’s info/data. As required, make a parameter change using the alphanumeric data entry field in the Parameter Value column. Similar to other setup menus there is a Send Changes to Device button to transmit any parameter change to the ST80/ST80L. Use of the Send button, however, requires the Factory level password.

Note: Some listed parameters are not applicable depending on the instrument model/configuration.

Figure 36 – Example Parameter Report, Group 1

Figure 37 – Example Parameter Report, Group 5
Compare to Download File

Use the **Compare to Download File** button to quickly check the instrument’s parameters with a previously saved/downloaded calibration file generated by the Cal2 program at the factory (refer to “Download Calibration” on page 8 for details on how to download the calibration file directly to the instrument). Follow the instructions below to perform the comparison.

1. Click **Compare to Download File**. Observe that an Open File dialog appears.
2. Navigate to the Cal2-generated text file’s directory/folder (local drive or network location), select the appropriate file, and then click **Open**.
3. Observe that the parameters list changes to show comparison results with columns showing **Unit Value**(instrument’s parameter value), **File Value**(the file’s parameter value), and **File Match**. In the File Match column, an unchecked box indicates a parameter mismatch and a checked green box indicates a parameter match. See example screen below. Make individual parameter changes as necessary by clicking **Reload Group x**, typing in the parameter value, and then clicking **Send Changes to Device** (Factory level password required).

**Note:** The calibration file is a text file with the following default filename format:

SerialNo_CustomerNo_CalGroup_FE/Head.txt.

Example: For an instrument with serial number 492890, customer number C076370, calibration group 1, and a single FE/head, the calibration file filename would be: 492890_C076370_1_1.txt.

![Example Parameter Report With Download File Comparison Results](image-url)

Figure 38 – Example Parameter Report With Download File Comparison Results
Customer Service/Technical Support

FCI provides full in-house technical support. Additional technical representation is also provided by FCI field representatives.

*By Mail*
Fluid Components International LLC  
1755 La Costa Meadows Dr.  
San Marcos, CA 92078-5115 USA  
Attn: Customer Service Department

*By Phone*
Contact the area FCI regional representative. If a field representative is unable to be contacted or if a situation is unable to be resolved, contact the FCI Customer Service Department toll free at 1 (800) 854-1993.

*By Fax*
To describe problems in a graphical or pictorial manner, send a fax including a phone or fax number to the regional representative. Again, FCI is available by facsimile if all possibilities have been exhausted with the authorized factory representative. Our fax number is 1 (760) 736-6250; it is available 7 days a week, 24 hours a day.

*By Email*
FCI Customer Service can be contacted by email at: techsupport@fluidcomponents.com.
Describe the problem in detail making sure a telephone number and best time to be contacted is stated in the email.

*International Support*
For product information or product support outside the contiguous United States, Alaska, or Hawaii, contact your country’s FCI International Representative or the one nearest to you.

*After Hours Support*
For product information visit the FCI website at www.fluidcomponents.com. For product support call 1 (800) 854-1993 and follow the prerecorded instructions.

*Point of Contact*
The point of contact for service, or return of equipment to FCI is your authorized FCI sales/service office. To locate the office nearest you, visit the FCI website at www.fluidcomponents.com.