

# SmarConf™ HART® Configurator

## Introduction

**SmarConf™ HART® Configurator** is a software application dedicated to configure generic HART® devices. It is a tool to interact with devices installed on HART® network or in a point-to-point architecture.

The tool can access devices in the field and is a great aid to the workshop helping on maintenance and troubleshooting.

The application also works with not listed devices from Smar or from 3<sup>rd</sup> party manufacturers.

When the software doesn't find a device on its programmed list, it will treat a device as generic following the basics commands defined by the HART® foundation. The user will be able to work with the fundamental operations.

## Best diagnostic and troubleshooting tool for SMAR devices

SmarConf™ carries the most complete set of diagnostic and troubleshooting tools for SMAR field products that uses the HART® protocol.

The user can access superb calibration features. For instance, it is possible to recalibrate the internal current generator, temperature sensor and the measuring process variable. Calibration can be achieved with two or multiple points, in case the linearity of the measurement needs to be compensated.

## ONLINE, OFFLINE and documentation

The devices can be ONLINE or OFFLINE during the configuration.

The ONLINE mode works well during commissioning, start up and regular operation while the field devices are operating. Special care should be taken during ONLINE operation if the device is participating of any critical measurement or control activity.

User can collect data from devices online and save in a file for later use as for helping to configure similar devices.

Other way to work is to have configurations done in offline to be downloaded later to devices online.

During OFFLINE mode, the user has a space to add important notes.

## Real time Monitoring, Graphics logging and Analysis

SmarConf™ application carries additional functionality with the capability to monitor variables in real time, visualize a graphic behave of a set of variables and saving the graphics for later analysis.

## Hard-Key

The SmarConf™ Configurator needs to be bounded to a licensing Hard-Key to work ONLINE.

The Hard-Key can be found in the form of a simple USB license dongle (SmarKey™) or built in to the USB-to-HART® interface (SmarConf™ USB-HART®)

It is not necessary to have a Hard-Key to use the SmarConf™ Configurator in OFFLINE mode. The Configurator will be functional but will NOT engage in any online operation.

## License Options

Every SmarConf™ Configurator must be bounded to a Hard-Key to run in full feature mode. The Hard-Key works as the license for the application to work.

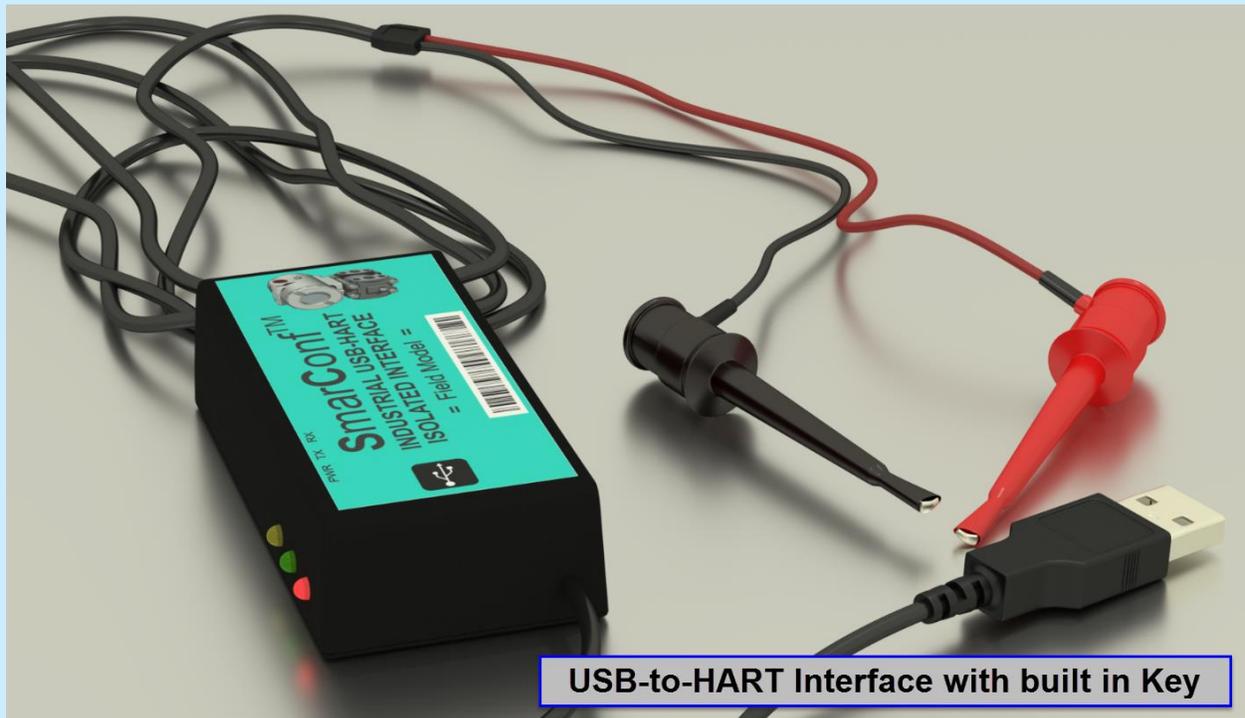
There are two types of Hard-Keys to operate the SmarConf™ Configurator at full capability and all of them use one of the available USB ports in the PC. See available packages below.

## SmarConf™ & Key Package



Application software SmarConf™ comes with a SmarKey™ (USB license key without communication interface). In this way, this application can run with any supported interface to communicate with HART® devices.

## SmarConf™ & Interface Package



If the customer gets the SmarConf™ package that comes with the Smar's interface (SmarConf™ USB-to-HART interface), he will not need a separated Hard-Key (SmarKey™) once the communication interface carries a built in license itself.

### What can I do without the Hard-key?

Users can still use the SmarConf™ Configurator OFFLINE capabilities. Devices can be configured OFFLINE and saved for later download from a PC using SmarConf™ Interface that will give the ONLINE capabilities to the application.

## Working with other HART® interfaces

If the SmarKey™ or a SmarConf™ USB-HART interface is present in one of the USB port in the computer, then the application can also communicate using a proper serial HART® interface from a 3<sup>rd</sup> party.

SMAR also carries a generic HART® interface to be use with another configurator, the SmarHart™ USB-HART® isolated interface.



## Opening the SmarConf™ HART® Configurator Application

### From the Windows Start menu

1. Select Programs.
2. Find SmarConf™ in listing and click on the icon to start.

### From your desktop

1. Double click on the SmarConf™ icon.

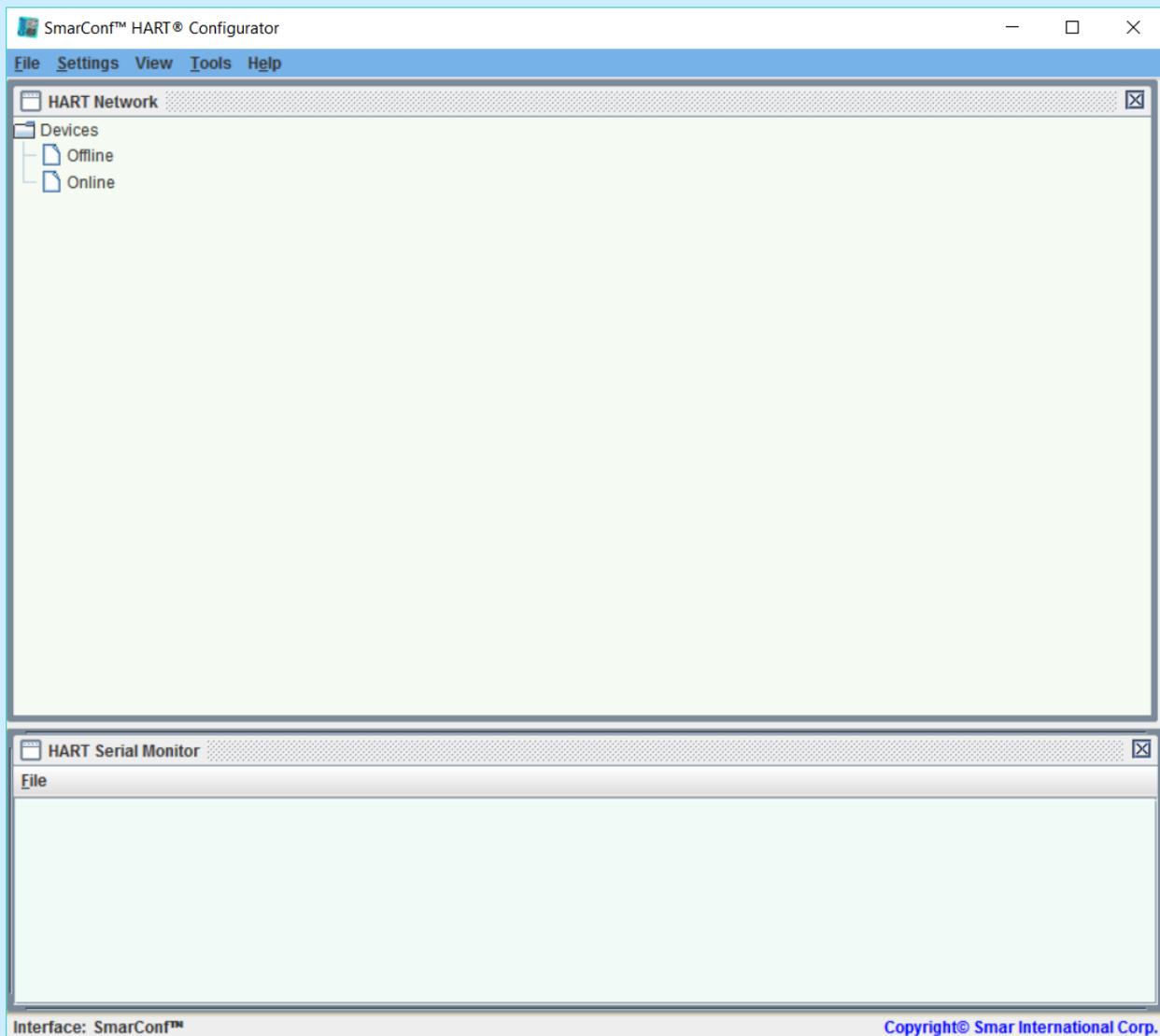
If you do not currently have your Hard Key (USB-Key or a SmarConf™ Interface) connected to your computer, you will see a message informing you that the Hard Key is not accessible and you will only have OFFLINE capabilities while using the SmarConf™ Configurator in this condition.

To continue working in the program with only OFFLINE capabilities, click the OK button.

To work with ONLINE capabilities, click the OK button, exit the SmarConf™ HART Configurator, properly attach your Hard Key and re-open the SmarConf™ Configurator following the instructions above.

*If you still get this error message after you have properly installed your Hard Key, contact Smar technical support.*

## Initial Screen

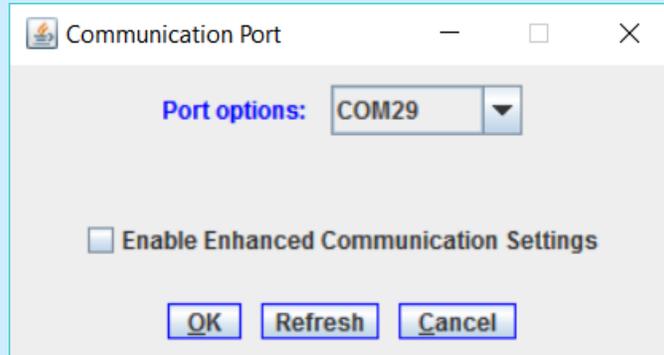


To exit the SmarConf™ software, select the Exit option from the File menu. You will be prompted to save any files which have been changed and not saved during your current SmarConf™ session.

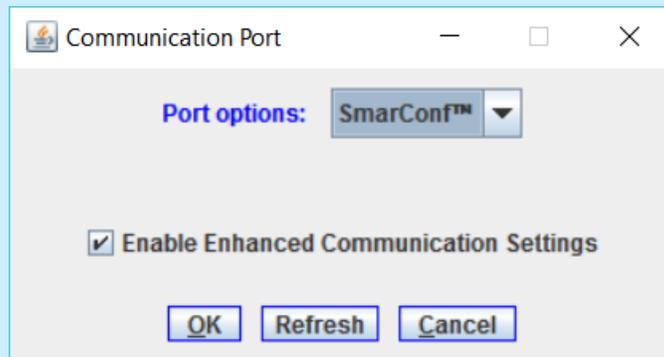
# Preparing for ONLINE device communication

## Setting the Communications Port

1. Select the “Communication Port” option from the Settings menu. The Communication Port window will appear on your screen with the currently opened port selected in the Port Options combo box



If a SMAR interface is connected, instead of COMx, it will show the interface name:



2. Select the desired communication port from the Port Options combo box which contains a drop-down list of available ports located on your system. If you are using the HFI400 USB Interface, the option HFI400 should be selected.

3. Click OK to open this port or Cancel to close the Communication Port window.

The selected port will be used by SmarConf™ for all current and future sessions.

The previously opened port will automatically be closed once you click OK and request to open another port.

Check the box for “Enable Enhanced Communication Settings” the HART® network is using BURST or intensive communication with a DCS system. Older PCs may not support this mode.

## SmarConf™ HART® Configurator

The SmarConf™'s initial screen includes the Main menu and the HART Network Frame.

From the “HART Network” windows you can choose to work with Offline or Online devices.

It is possible to have more than one Offline and Online transmitters in the list.

### Polling Online Devices

SmarConf™ can locate devices on your HART® network through a polling process.

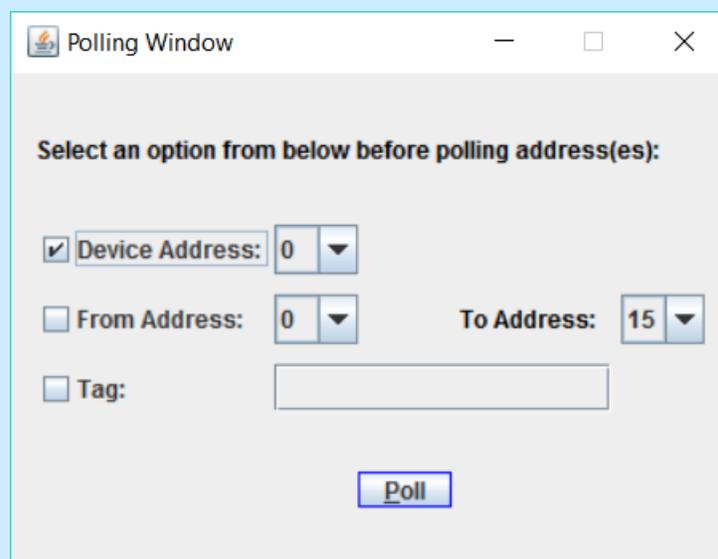
There are three ways to poll for devices, all of them begin with opening the Polling Window by selecting this option from the Tools in the menu.

- Go to Tools menu and click on “Polling Window”.

### Polling for a Single Device

To poll for a single online device by address:

1. Check the Device Address box in the Polling Window dialog box.



Polling Window

Select an option from below before polling address(es):

Device Address: 0 ▼

From Address: 0 ▼ To Address: 15 ▼

Tag:

Poll

2. Choose the address of the device by selecting it from the option box located next to the Device Address checkbox.

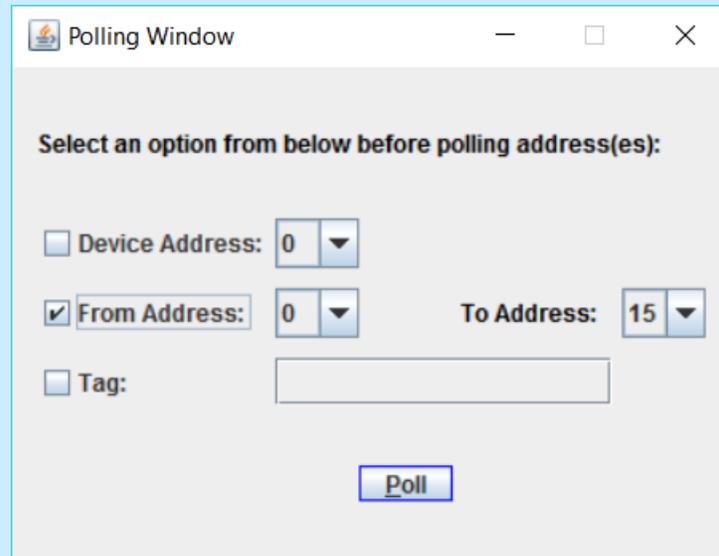
3. Click the Poll button and see the progress bar.

The device, if found, will be added to the Online directory tree of the HART Network Frame.

### **Polling for Multiple Devices**

To poll for multiple devices:

1. Check the From Address on the Polling Window.



The screenshot shows a window titled "Polling Window" with a standard Windows title bar (minimize, maximize, close buttons). The window content has a light beige background and contains the following elements:

- A bold instruction: "Select an option from below before polling address(es):"
- Three radio button options:
  - Device Address: 0 (with a dropdown arrow)
  - From Address: 0 (with a dropdown arrow) To Address: 15 (with a dropdown arrow)
  - Tag: (with an empty text input field)
- A "Poll" button at the bottom center.

2. Select the start and end address range for your search from the combo boxes located next to the From Address label, which will be the start of the range, and the To Address label, which will be the end of the range.

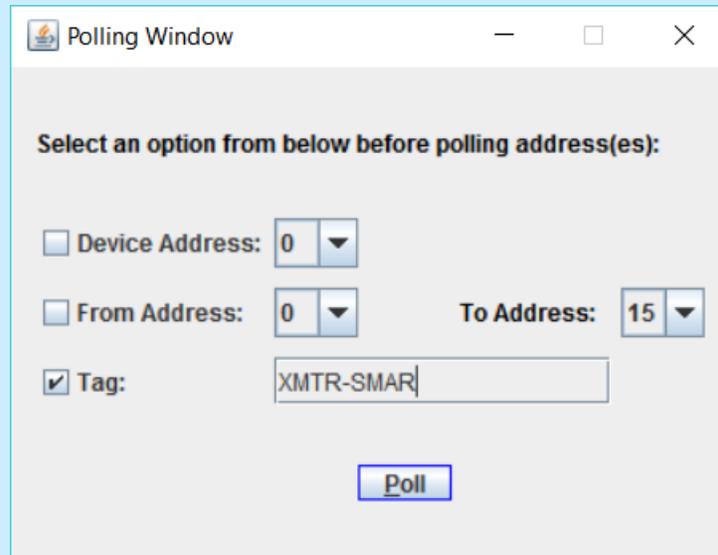
3. Click the Poll button.

If any devices are found within the address range specified, they will be added to the Online directory tree of the HART Network Frame.

### **Polling for a Device by Tag**

To poll for an online device by its Tag description:

1. Check the Tag option on the Polling Window.



2. Enter the Tag of the device you are looking for in the text field located to the right of the Tag option.

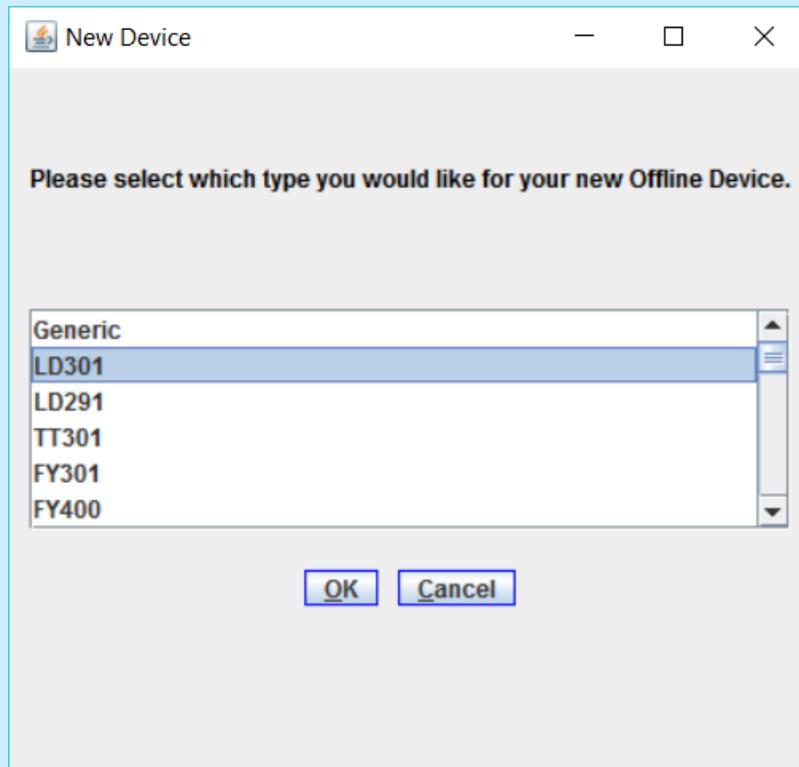
3. Click the Poll button.

The device, if found, will be added to the Online directory tree of the HART Network Frame.

## Creating A New Offline Device

1. From the File menu, or right-clicking on "Offline" in the HART Network tree, select the New Offline Device option.

2. Select a device type from the New Device window. Use the scroll bar to see all available options.



Select “Generic” from the list in the case you don’t find the specific device you are looking for.

3. Click OK to create a new device of the chosen type or Cancel to close the New Device Window.

The device will be added to the Offline directory tree of the HART Network Frame. The Device Frame containing the new device will be opened on the screen.

### **Opening an Offline Device File**

1. From the File menu, or right-clicking on “Offline” in the HART Network tree, select the Open Offline Device option.

2. An Open dialog will appear on your screen.

3. Select the name and location of the device to open.

4. Click the Open button.

The device will be added to the Offline directory tree of the HART Network Frame. The Device Frame containing the selected device will be opened on the screen.

## Opening a HPC301 Database File

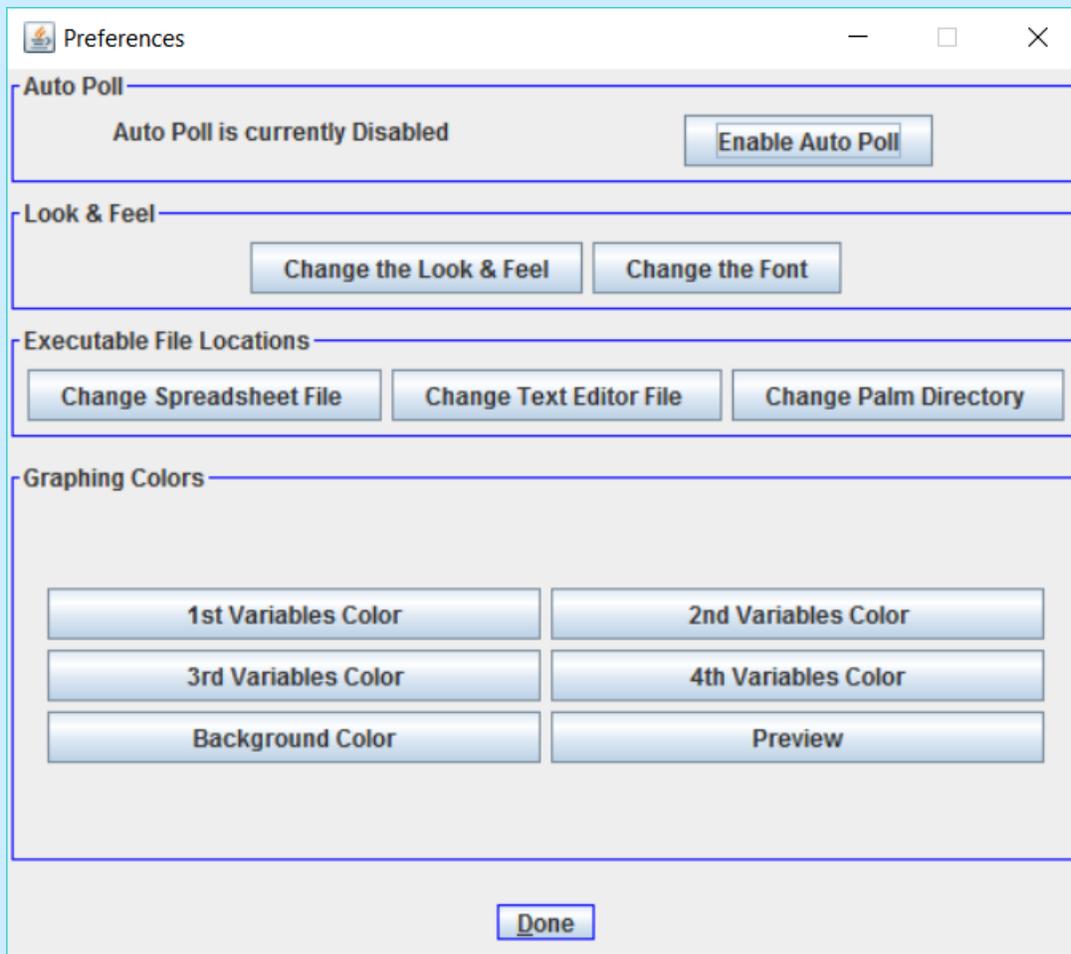
1. From the File menu, select the Import from a HPC301 Database file option.
2. An Open dialog will appear on your screen.
3. Select the name and location of the HPC301 Database device file that contains the palm devices you would like to import.
4. Click the Open button.

The imported devices will be added to the Offline directory tree of the HART Network Frame and their Device Frames will be opened on the screen. Imported HPC301 devices will be distinguishable by their device reference, the tag value of the device will be followed by "HPC301".

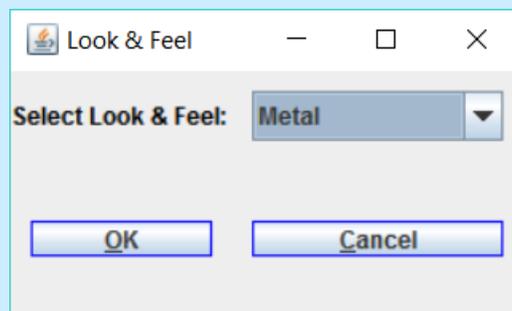
## Changing the Look & Feel of the SmarConf™

SmarConf™, by default, uses the Metal Look & Feel. To change the way the application appears on your screen:

1. Select the Look & Feel option from the Settings -> Preferences menu.



2. Click on Change the Look & Feel button and a window will open on the screen.



2. Select the desired Look & Feel from the combo box which contains a pull-down list of your systems' available options.

3. Click OK to change the Look & Feel or Cancel to close the window.

*Note: you will need to restart the program for these changes to take effect.*

## Setting the Auto Poll option of the SmarConf™

SmarConf™, by default, does not automatically poll addresses upon initialization, this option is available to the user if they would prefer to poll address 0 when the application opens. This option can be set or unset by selecting the Auto Poll option from the Settings -> Preferences Menu. If this option is currently enabled, you will be prompted to confirm your decision to disable this option, if this option is currently disabled, you will be prompted to confirm your decision to enable this option. If this option is enabled when the SmarConf™ application is launched, the address 0 will immediately be polled for devices upon initialization.

## Learning About the SmarConf™ HART® Configurator

Information about the SmarConf™ HART Configurator, including copyright and version information, is available from the About window which can be opened by selecting the About option from the Help menu.

## Opening the HART Network Frame

The HART Network Frame is automatically opened when the application starts. To reopen the window if it has been closed, select the HART Network Window option from the View menu.

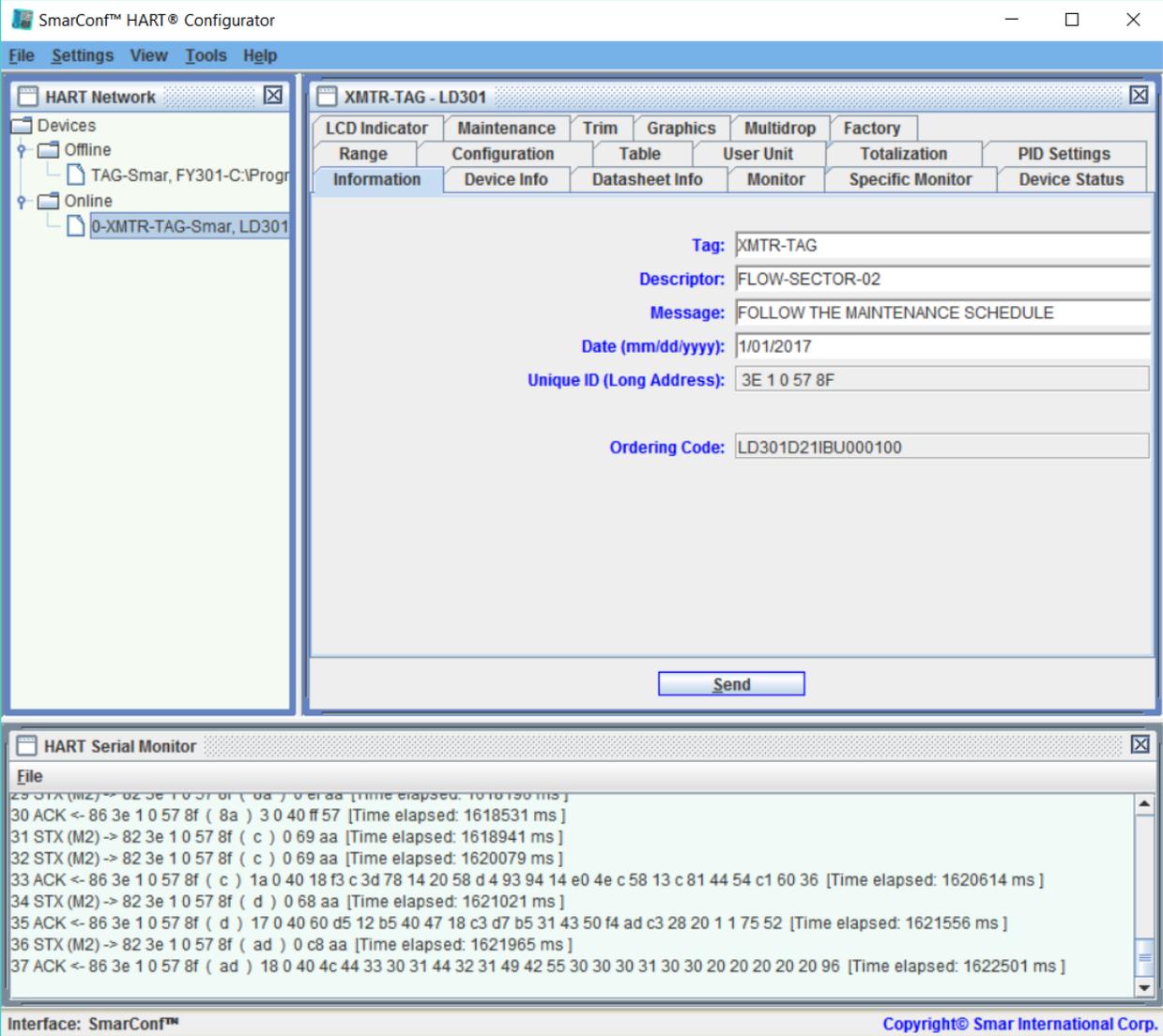
A good way to get on it is to use the menu. Go to VIEW -> Default View.

## Showing all device information

After a device is opened in OFFLINE or ONLINE, go to the Hart Network window and select it in the tree and double-click on it.

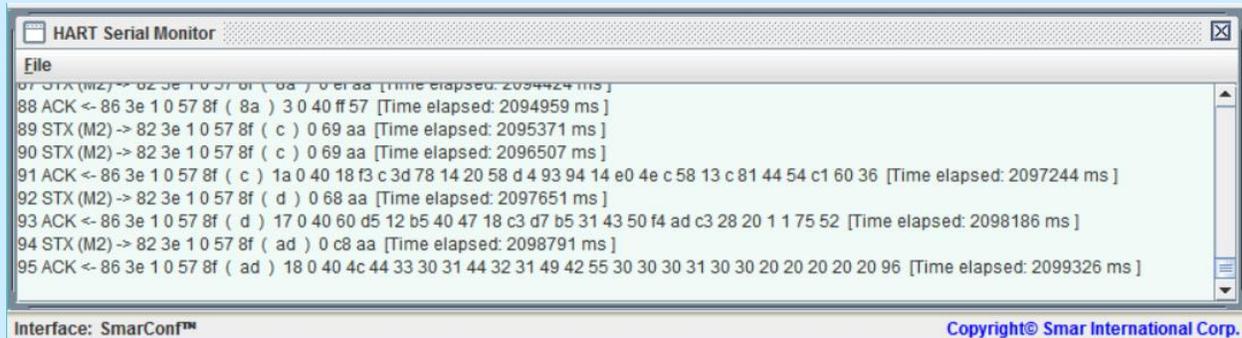
SmarConf™ will show the device transmitter details in the right. Initially it shows the TAB where the device information can be seen.

It will look something like this:



## HART Serial Monitor

The HART Serial Monitor is a powerful tool for working with online devices. The SmarConf™ HART Serial Monitor shows each command being sent (STX) to or received (ACK) from the device in real time. It can help troubleshooting problems with a device and ensure the proper commands and data are being sent to and received from the device.



The HART Serial Monitor opens automatically when you start the SmarConf™ software. If you close the Serial Monitor during a SmarConf™ session, it can be reopened by selecting the HART Serial Monitor option from the Tools menu.

### HART Serial Monitor File Menu

The HART Serial Monitor has its own File menu with functions specific for the Serial Monitor. The HART Serial Monitors' File menu contains the following options:

**Clear** - Clears the text content of the HART Serial Monitor window.

**Find** - Searches for specified text within the HART Serial Monitor.

Found text is highlighted in blue. To continue searching for additional occurrences of the same text, click the Yes button when prompted in the Text Found dialog.

If no additional occurrences of the text are found, or if the text was not found originally, the Search Failed window will appear on the screen.

**Print** - Prints the text contents of the HART Serial Monitor to your local printer.

**Save** - Saves the current contents of the HART Serial Monitor to a text file. The save dialog box that opens allows you to name the file and select its location.

**Number Format** - Changes the number format used to display the communication in text of the HART Serial Monitor.

The HART Serial Monitor, by default, shows the communication bytes in hexadecimal format but it also has the option of viewing the bytes in decimal format. To change from hexadecimal format to decimal format simply choose the Number Format option from the HART Serial Monitor File menu.

A dialogue box will ask you to confirm the change in number format. Follow the same procedure to change back to hexadecimal format. Changes will be noticed on the next time the device communicates.

**Close** - Selecting this option closes the HART Serial Monitor Window. The current text contents of the window remain until you close the application or clear the screen using the menu option. Re-opening the window will return the current contents to the screen.

## Device Data Form

The Device Data Form feature of the SmarConf™ allows the user to create new or open previously defined Device Forms which permit the user to define which variable's data should be exported into their specific spreadsheet (.csv) files. This new feature can be accessed from the Tools Menu by selecting the Device Data Form option. Upon selection of this option from the menu, the user will be prompted to select from either creating a new Device Form or opening a previously stored Device Form.

If the user selects the New option, a Save dialog will appear on the screen where the user should type a file name for the new Device Form. An Open dialog will appear if the user selects the Open option, where the name of the desired stored Device Form should be selected. The Device Form created or opened will contain a .dft extension and is recommended that the user store these files in this default Form directory that was created for this purpose.

## Creating a New Device Data Form File

To create a New Device Form, the user should follow the steps described in the About the Device Data Form File, selecting the New option from the Device Data Form option. Upon entering a file name and selecting the Save button from the Save Dialog an initial Device Form Panel will be presented on the screen. This panel asks the user to define the basic initial information concerning this new Device Form. The first set of checkboxes ask the user to decide if this Device Form will extract data from a single device or multiple devices, by default, the single device check box will be selected. The next set of checkboxes asks the user if this Device Form will extract data from online or offline devices, by default, the offline check box will be selected. The user will be asked to decide which type of device this Device Form will extract data from, the options include Generic, LD301, LD291, TT301, FY301, DT301, or HCC301 devices. Next the user will be given the option to define a specific header or use the default header for this Device Form. The default header is selected by default and will contain the form name, which is the file name by default but may be changed by the user, on the first line, the date on the second line, and the time on the third line. The header will always contain three lines, if the user selects a specific header, they may define what information goes on what line, or if all

the information should be shown on the same line, but all Device Forms will contain three lines in their header. The time and the date information will be current to the time or date that the user creates the .csv file, not the .dft file, so these variables will correspond directly to the data that is extracted. Finally, the user must define whether this Device Form will show the code value of the selected variables next to the actual value or if only the actual value should be shown. By default, the Device Form does not show the code value but the user may choose to do so by selecting the Yes check box. Once these initial values are defined, the OK button should be selected in order to continue with the new Device Form definition. The Cancel button, if selected, will discontinue the new Device Form procedure and bring the user back to the main SmarConf™ screen.

The next step in the new Device Form procedure is the Device Data Form window that will be opened when the user selects the OK button after selecting the initial Device Form information. The Device Data Form Panel will contain information specific to the information previously entered by the user. The Device Data Form Panel is broken up into two main parts, the Header Information and the Device Data Information. The Header Information contains options for the user to define the header information of this Device Form and the Device Data Information contains options for the user to define the device variable information of this Device Form. If the default header is chosen, the user does not have the option to change any of the information but they may choose to select either the Don't show header check box or the Show variable headings horizontally check box. The Don't show header check box, if selected, will remove the header entirely from the .csv file when created and the Show variable headings horizontally, if selected, will place the variable names in the first row following the header of the .csv file and the values in the second row. If this option is not selected, the variable name will be placed in the first column of the .csv file, and the values will be placed in the second column. This option is dependent that this Device Form extracts data from a single device. If this Device Form extracts data from multiple devices, the .csv file created will automatically place the first device data in the first row following the header, the second devices' data in the second row, etc. The Show variable headings horizontally check box will not be available on a Device Data Form Panel that has multiple device extraction selected. The Form Name, Date, Time, and Company Name values may be included in the Header by selecting the appropriate check box, these values may also be excluded from the Header by unselecting the check box. Typing the desired text value into the appropriate text field will set the Form Name and the Company Name values. The user may add a new text value to the Header by selecting the "Add Header Item" button. Once the desired text value is entered into the text field, the user should press the OK button to add this item to the Header or the Cancel button to ignore this change to the Header. By default, this new item will be added to the third line of the Header after the last variable entered but the user may change this order. A user defined header item may be removed from the Header if desired by selecting the Remove Header Item button. The currently selected header items will be displayed on this panel and the user should select the check box of the item they would like to remove and press the OK button. If no items should be removed, all the check boxes contained in this panel should be unselected. If the Form Name, Date, Time, or Company Name are contained in the Header, they will be shown in this panel but these checkboxes may only be selected or deselected from the main Header Information. Once the OK button is pressed, all items that are selected will be permanently removed from the Header. The Header values will be shown in the order they were selected or added to the Header. The user may alter this by selecting the Set

Header Order button. The items contained in the header will be shown with their current order contained in the text box on their left. These numeric values may be changed to alter the show order as long as the order is kept consecutive, if the user types in an unacceptable order they will be prompted to correct this before the order panel will close.

Like the Header values, the line order of the header will depend on the addition and selection of the header items. By default, the first item will be set on the first line of the header, the second item on the second line, and all items thereafter will be added to the third line. This may be altered by the user by selecting the Preview / Edit Header button. The top portion of this panel shows the header as it will be printed in the .csv file upon creation, following this is the items with a text box containing their line number to the left. This may be changed by the user as long as the items stay in their variable order, if the user tries to put the first variable after the last variable, the user will be prompted to correct this before closing the panel.

The Device Data Information like the Header Information contains information dependent on the basic initial information of this Device Form. The specific tabs of the Device Data Information will contain variable check boxes of the variables found on the Device Frame panels of these devices. Not unlike the Header Information, the variables may be selected by checking the associated check box, if the variable is selected it will be extracted into the .cvs file upon creation. Also like the header information, the device variable order is determined by the selection order but may be changed by selecting the Set Variable Order button. The generic variables, variables contained in ALL devices, will be displayed first. If the device is specific, the variable order of the specific variables may also be altered by selecting the Set Specific Variable Order button and continuing in the same fashion. The variable name will be displayed with the numeric order value contained in the text box to its left. The user may change these numeric values as long as the order entered is consecutive, if not, the indexing error message will be displayed until this is corrected. Only the variables selected are shown on the Set Variable Order Panels. Once complete, the Done button should be pressed to complete the New Device Form operation. If the Cancel button is pressed, the entire operation will be terminated and the user will be returned to the main SmarConf™ screen. The last stage of a New Device Form creation is the same as the Opening of a Device Form, please refer to the next section for details of the completion of the creation of a Device Form.

## **Opening a Device Data Form File**

To open a Device Form, the user should follow the steps described in the About the Device Data Form File section of this manual. Selecting the Open option from the Device Data Form option and upon selecting the desired file name and pressing the Open button from the Open Dialog a Device Data Form Panel will be presented on the screen. The Device Data Form Panel will contain all available devices available for this Device Form. If this Device Form extracts data from online devices, this Device Data Form Panel will contain any devices found on the Online Directory tree. If this Device Form extracts data from a specific device, this Device Data Form Panel will contain device of that specific type. If however, there are no devices found specific to the selected Device Form, a message will be shown to the user informing them that no devices were found.

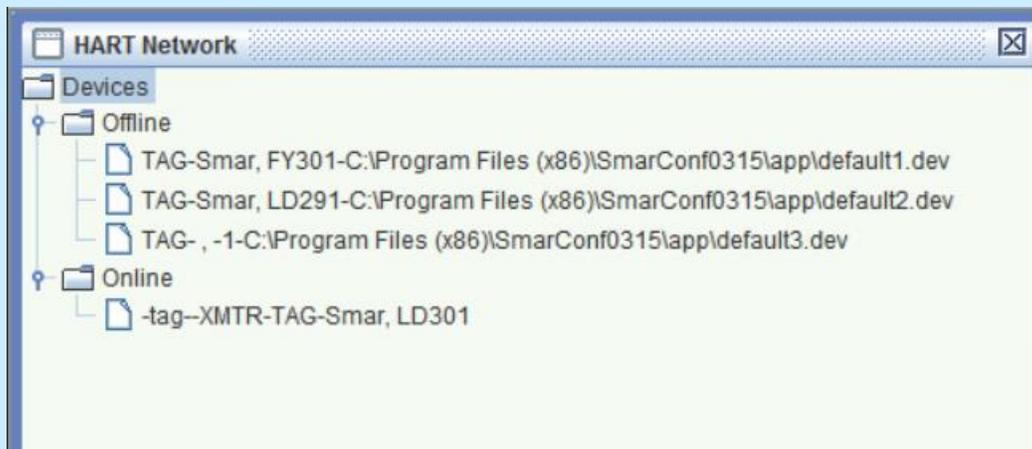
If the Device Form extracts data from single devices, only one device may be selected from the Device from Data Panel at a time, if the Device Form extracts data from multiple devices, the user may select as many devices as available from this panel. At this point in the Device Form procedure, the user may choose to complete the process and select the Export Data button. Upon selection of this button, all devices selected will have the defined data variables extracted and stored into a .csv file, this file will be opened for the user in their spreadsheet program.

If the Device Form had been defined to extract data from an online device, there are a few more constraints on the device. First, the device must be open in order to extract the data and second, if all the variables from the device have not been read, the user will be prompted to do so before continuing.

The user may choose the Cancel button, which will close this Device Data Form Panel and return the user to the main SmarConf™ screen ending this Device Form operation. The user may also choose the Edit Device Data Form button. This option will return the user to the initial Device Form Panel screen discussed in the Opening a New Device Form section of this manual, with the definitions of this specific Device Form selected. Any changes made to the selections will be saved to this file when the OK or Done buttons are pressed.

## HART Network Frame

All device manipulation takes place from the HART Network Frame. The HART Network Frame includes Offline and Online directory trees.



When devices are found on a network or device files created they are placed in these trees. For example, if you poll for a device at address 0 and it is found it will be placed in the Online directory tree and will remain there until it is closed using the File menu option or the application is closed. If you create a new device file or open a stored device file, it will be placed in the Offline directory tree.

The icon indicates if the Online or Offline directory tree contains a device. If there is no device in the directory tree, the icon to the left of the tree will look like a blank sheet of paper. If the tree contains a device, the icon to the left of the tree will look like a file folder.

## Device References

Offline devices are displayed in the HART Network Frame with a string starting with the devices Tag, followed by its Manufacturer and Device Type and ending with the full filename of the device.

Online devices are also displayed in the HART Network Frame with a string but starting with the devices address, followed by its Tag, and ending with the Manufacturer and Device Type.

## Adding Devices to the HART Network Frame

You may add new offline devices to the Offline directory tree by:

1. Selecting the New Offline Device option from the File menu or the Offline directory tree popup menu;
2. Selecting the Open Offline Device option from the File Menu or the Offline directory tree popup menu;
3. Selecting the Save As option from the File menu or the Offline Device popup menu and creating a new device from a previous offline device;
4. Selecting the Upload option from the Online Device popup menu of an open offline device and creating a new offline device from a previous online device; or,
5. Importing a HPC301 Database file.

You may add new online devices to the Online directory tree by polling for a new online device using the Polling window.

## Offline Directory Tree Popup Menu

The Offline directory trees' popup menu is accessed by highlighting the Offline tree and right-clicking the mouse. It includes two functions:

**Open Offline Device** - Opens a previously saved device file and adds it to the HART Network Frame as well as opens the devices' Device Frame to the screen.

**New Offline Device** - Opens the New Device window which enables you to create a new offline device of your choice.

## Online Directory Tree Popup Menu

The Online directory trees' popup menu is accessed by highlighting the Online directory tree and right-clicking the mouse. It includes two options:

**Polling Window** - Opens the Polling Window which allows you to poll for new online devices.

**HART Serial Monitor** - Opens the HART Serial Monitor window which allows you to monitor the communication status.

## Offline Device Popup Menu

The Offline Device popup menu is accessed by right-clicking on a highlighted offline device listed in the Offline directory tree. The available functions of this menu include:

**Open Device**- Opens the selected offline devices' Device Frame. Only available when the devices' Device Frame is not currently open.

**Save** - Saves the current device to file. Only available after the devices' Device Frame has been opened.

**Save As** - Saves the current device to a new file and creates a new offline device. Only available after the devices' Device Frame has been opened.

**Export to a HPC301 Database file** - Exports the current devices' information to a HPC301 database file. Only available after the devices' Device Frame has been opened.

**Download** - Sends the current devices information to a online device. Only available after the device has been opened.

**Print Device** - Prints the current devices' information to the local printer or to a text file. Only available after the device has been opened.

**Export to .csv file** - Exports the current devices' information to a standard comma separated values file. Only available after the device has been opened.

**Close Device** - Removes the current device from the Offline directory tree and if the device is open, removes the devices' Device Frame from the screen.

## Downloading an Offline Device

You can download data from an offline device to an online device by selecting the Download option from the Offline Device popup menu. When the Download option is selected, the first Download Device window appears on the screen listing all available online devices of the same type as the offline device selected to download from.

Select the online device which is to receive the data. Click the Download button located at the bottom of the window to continue or Cancel to close this Download Device window.

Once an available online device has been chosen, the next Download Device window will appear. This window gives you the option of either sending specific data, or all of the data, to the device. Each specific device type will have its own appropriate data panels available for download. Check the panel which contains the data you would like to download and click the Download button to continue or the Cancel button to close the Download Device window and terminate the operation. You may check the All Panels option to send all the data to the download device. Only one option may be selected at a time, this Download Device window will remain on the screen until the Cancel button is pressed leaving the user the option to send as many panels of data as desired before terminating the operation.

## Exporting Device Data to a HPC301 Database File

Select the Export to a HPC301 Database file option from the Offline Device popup menu to save changed device data from a previously imported palm device or to save a offline device to a HPC301 Database file as a new record.

When this option is selected, if the Offline Device selected was imported from a HPC301 Database file, the changed data from this device will be saved back to the original file. If this device was not previously imported, a Save file window will open, prompting you to select a filename and location, this file must be a valid HPC301 Database file or this device will not be saved as such.

All HPC301 Database files will contain "HPC" followed by the device type as its filename and extension .hpc. Usually, HPC301 database files can be found in your C:\\ Palm \\ *username* \\ HPC301DB directory. Once a valid file is chosen, you will be prompted to add this device as a New Record, press OK to save this device information or Cancel to abort the operation.

If the database file chosen is not of the correct device type, an Invalid HPC File error message will appear on the screen. You will need to choose the correct file for the device type, if the specific device type does not contain a HPC database file, it should be saved as a generic device.

## Printing Offline Device Data

Select the Print Device option from the Offline Device popup menu to print information about the selected device.

When the Print Device option is selected, a Save file window will open, prompting you to select or enter a filename and location. The device information will be saved to a text file prior to printing.

After the file has been saved, your chosen text editor will display the text contents of the file to be printed.

The devices' reference is listed at the start of the print file, along with the current date and time. The information held in the device follows, with the data separated into logical groups. To print the device information, select the Print option from the text editor's menu.

## Exporting Offline Device Data

Data contained in an offline device can easily be exported into a standard comma separated values file by selecting the Export to .csv file option from the Offline Device popup menu. Selecting this option will open a Save File dialog which will allow you to select the filename and location where this file will be stored. Once saved in the \*.csv format, the data can then be manipulated in other programs such as Microsoft Excel.

## Closing an Offline Device

An offline devices' Device Frame can be closed and the device removed from the HART Network Offline directory tree by selecting the Close Device option from the Offline Device popup menu or directly from the SmarConf™ HART Configurators' main File menu.

rom the Offline tree. If, on the other hand, changes were made to the device, the option of returning to the Device Frame and saving these changes will be given.

## Online Device Popup Menu

The Online Device popup menu is accessed by right-clicking on a highlighted online device listed in the Online directory tree. The available functions of this menu include:

**Open Device** - Opens the selected online devices' Device Frame. Only available when the devices' Device Frame is not currently open.

**Upload** - Sends the current devices information to a newly created offline device. Only available after the devices' Device Frame has been opened.

**Print Device** - Prints the current devices' information to the local printer or to a text file. Only available after the devices' Device Frame has been opened.

**Export to .csv file** - Exports the current devices' information to a standard comma separated values file. Only available after the devices' Device Frame has been opened.

**Close Device** - Removes the current device from the Online directory tree and if the device is open, removes the devices' Device Frame from the screen.

## Opening an Online Device

Selecting the Open Device option from the Online Device popup menu opens the selected online devices' Device Frame and reads required data from the device. A Progress Monitor window tracks the progress and closes when the reading is complete.

## Uploading an Online Device

Online devices cannot be saved to a file, but you may upload the online device data to an offline device file and then save this device to a file. There is no data loss in the process.

Once an online devices' Device Frame has been opened, select the Upload option from the Online Device popup menu to send the data from the online device to a new offline device.

Upon selecting the Upload option, the SmarConf™ application will advise you that this operation may take a few minutes. To finish reading the data from the device, click the OK button and the Upload process will continue. If you click the Cancel button, the Upload process will be terminated.

During the Upload procedure, a Progress Monitor dialog will remain on the screen until complete to continuously inform about the status of this process.

Once completed, a Save dialog will appear on the screen where you can select the name and location of where your new offline device will be stored. Your new offline device will be added to the Offline directory tree and have all the capabilities of a standard offline device while the online device you just uploaded will remain on the Online directory tree until you choose to close it.

## Printing an Online Device

An online device's data can be printed to your local printer and/or saved as a text file. This operation is executed by selecting the Print Device option from your Online Device popup menu.

If all data variables of the device have not yet been read, an Initialize Values window will appear on the screen. If you decide not to read the rest of these variables, press the No button, a Save dialog will appear prompting you to set the name and location of the text file. Once you have entered an appropriate name and selected the desired location, press the Save button, a Print Device window will appear on your screen. Any variables that have not been read will contain a null value.

To read the variables that have not yet been initialized, click the Yes button on the Initialize Values window. A Progress Monitor will appear on your screen informing you of the communication status. Once all variables have been read from the device, the Progress Monitor will disappear and you will need to re-select the Print Device option from the Offline Device popup menu to complete the process. A Save dialog will appear on your screen and you will be

prompted to supply a name and location for your text file. Once you have entered an appropriate name and selected the desired location, press the Save button, your chosen text editor will be launched and the file just saved with the information from your online device will be displayed. (See the Printing Offline Device Data section for additional information.)

## Exporting Online Device Data

You can export the data contained within an online device to a standard comma separated values file by selecting the Export to .csv file option from the Online Device popup menu.

If all of the device variables of your online device have not been read an Initialize Values window will appear on your screen. If you choose not to initialize the unread variables, press the No button and the exporting process will continue as with an offline device. If you choose to read the rest of the variables, press the Yes button and a Progress Monitor will appear on your screen informing you of the communication status. Once complete, reselect the Export to .csv file option from your Online Device popup menu. Again, the exporting process will continue as with an offline device with the exception that the file will contain data more appropriate to an online device.

## Closing an Online Device

Selecting the Close Device option from the Online Device popup menu will close the selected online devices' Device Frame, if open, and remove it from the Online directory tree of the HART Network Frame.

After selecting this option, if there have been changes made to the device that were not yet sent, a Save Changes dialog will appear on the screen prompting you to do so. If you press the No button, the Save Changes dialog will disappear and the Device Frame will still be available to send any changes to the device. If you press the Yes button, the Save Changes dialog will again disappear but the Device Frame will close without sending these changes to the device. The online device will be removed from the Online directory tree of the HART Network Frame.

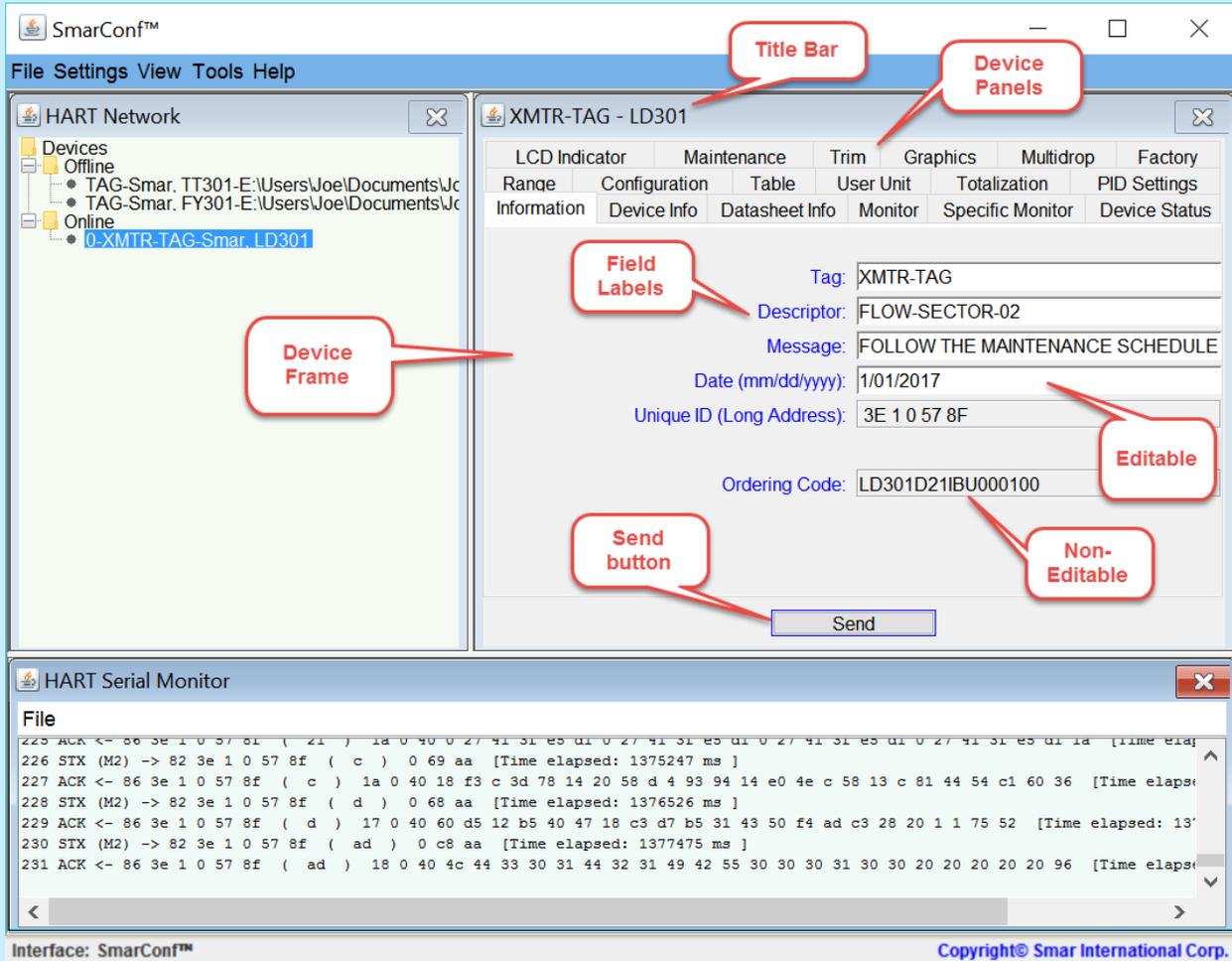
## Device Frame

All Device Frames whether they hold online or offline devices have the same basic structure. If the SmarConf™ has been configured for a specific device, screens and variables available in its device-specific frame will relate directly to the functionality of that device.

The SmarConf™ software will find all devices that conform to the HART protocol and are connected to the network when polled (searched) for. If the specific device is not recognized, the SmarConf™ will use its standard, generic screens and commands, utilizing the HART® Universal and Common Practice Commands, to display this device.

## Device Frame Layout

The general layout for all Device Frames appears below.



## Title Bar

The Device Frame's Device Title shows the device's Tag descriptor followed by the specific device type. If you have multiple devices open, the respective title bars will help you keep track as you work on different devices. (Generic Device Frames specific device type will read "null" in the Device Title, see the Device Frame Layout diagram).

## Device Panels

Each Device Frame has multiple Device Panels, each of which contains the devices' variables separated into logical sections.

All Device Frames include an Information Panel, which contains the basic information of the device such as the Tag, Descriptor, Message, and Date. While some devices may contain more specific variables on the Information Panel, they all contain at least these four variables.

You can select a specific Device Panel by clicking on its tab (see Device Frame Layout diagram - Panel Tab); this Device Panel will then become the panel in view allowing you to change the editable fields or analyze the read only fields contained in this particular panel. You can quickly determine which Device

Panel is in focus by looking at the tabs of the Device Frame. If the Device Panel is in focus its tab will be light gray, if the Device Panel is not in focus its tab will be dark gray. In the Device Frame Layout diagram, the Range Panel is currently selected.

### **Field Labels**

Field labels are a convenient way to determine which variable is presented in the field and whether the device is online or offline. If the device is online, the field label font color will be blue, if the device is offline the field labels will be black.

### **Editing Fields**

Editable fields are fields of variables that the user may change, whereas read only fields are not editable by the user. Editable fields will have a white background, while read only fields will have the same color background as the device panel (see Device Frame Layout diagram - Editable Field/Read Only Field). Text fields (see Device Frame Layout diagram - Text Field) can be edited by clicking your mouse inside the desired field and either selecting all of the text, or only the portion of text that is required to change, and typing in the new value.

If the field contains a combo box (see Device Frame Layout diagram - Combo Box) you can change the value by selecting it from the available options in the drop-down list. When the background of the combo box is the same color as the Device Panel you are able to select a new value from the drop-down list options only. If the combo boxes' background is white, you are able to type a new value into the combo box if the value you desire is not available from the drop-down list. Clicking the mouse on the desired combo boxes arrow and selecting the new desired value from the drop-down list will change the combo box value. To type a new value into the combo box simply click your mouse in the desired combo boxes' field and use the prompt to edit appropriately.

### **Option Fields**

Option fields allow you to choose a variables value by either clicking on one of several push buttons, or checking/unchecking a box. Push buttons will have field labels to their left, while checkboxes will have field labels to their right. Push button fields are used in cases where the variable has only two or three values associated with it, for instance, 'Enabled' or 'Disabled'. A push buttons' value is current when it's background color is black, if the push button is not the current value of the variable it represents, its' background color will be the same as the Device Panel. Simply clicking your mouse on the button that contains the new desired value will change the value of that variable.

A checkbox will only be used in cases where the variable can have one of two values, for example, 'On' or 'Off', or 'True' or 'False'. A checkboxes' variable is considered current or enabled when the checkbox has a check in it. Simply clicking your mouse on a checkbox will toggle it between checked or unchecked.

### **Save/Send Button**

The Save/Send button is an important component of the Device Frame. The text of this button will depend on the device which the Device Frame holds, an online device will have a Send button and an offline device will have a Save button. They do primarily the same thing, ensure the device acknowledges changes made by the user. If the device is offline, clicking the Save button found at the bottom of the Device Frame will execute a file save operation. If the device is online, the Send button will send the changes made to the current panel to the host device. If you press the Send button and no changes have taken place or there are only read only fields on the device panel, nothing will be sent to the device. If there were changes, the new values will be sent to the device and, if valid, will become the new values for the corresponding variables on the device. If you decide to switch Device Panels after changes have been made to an online device, you will be informed that you have made changes, and if you continue on

to the next panel, these changes will be lost. The Send/Save button is visible on every panel of every Device Frame even though some will have no use for it, for instance, a panel which contains only non-editable fields.

## Generic Device Frame

Any device using the HART® Protocol will be found when polled for by the SmarConf™ HART Configurator. If the specific device is not recognized by the program, the new device will be treated as a HART, or generic, device.

An Offline Generic Device Frame may be chosen to work with new devices that are not recognized by the SmarConf™ HART Configurator.

## Device Panels

Device Panels that are contained within a Generic Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),
- the Variable Codes Panel (online only),
- the Range Panel,
- the Configuration Panel,
- the Maintenance Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## Information Panel

The Information Panel of an online device contains the Tag, the Descriptor, the Message, the Date, and the Unique ID variables. If the device is offline, the Unique ID will be replaced with the Type variable.

The user may change the Tag, the Descriptor, and the Message variables to any alphanumeric string by clicking in the appropriate text field. The Tag variables' maximum length is 8 alphanumeric characters, the Descriptor variables' maximum is 16, and the Message variables' maximum is 32. All text entries are automatically converted to upper case, and spaces are included in the fields maximum length.

Clicking on the date field opens the Calendar window. Once the desired date has been set, clicking the OK button will close the Calendar window and enter the new date in the Date field. The user may select the present date by clicking the Today button. If the Cancel button is clicked, the old value will remain.

When editing an online device, the Send button must be clicked before changing panels to ensure the new values are acknowledged. If changes have not been sent a Send Changes dialog box will appear questioning if you really want to move on.

## Device Info Panel

*Online Only*

The Device Info Panel is available for online devices. This panel contains the Manufacturer, the Device Type, the Device Serial Number, the Transducer Serial Number, the Main Board Serial Number, the Software Version Number, the HART Universal Code, the Specific Revision, and the Physical Signal Code variables of the online device. *All variables contained in the Device Info Panel are read only and may not be altered by the user.*

## Monitor Panel

*Online Only*

When selected, the Monitor Panel continuously reads the included variables from the device and updates their values in the corresponding fields. These online device variables include the Loop Current and its corresponding unit, the Percentage Range, plus the Primary, Secondary, Tertiary, and Quaternary device variables along with their respective corresponding units. The Monitor panel is only shown if the device is online. *All variables contained in the Monitor Panel are read only and may not be altered by the user.*

## Specific Monitor Panel

*Online Only*

The Specific Monitor Panel continuously reads additional variable information from the device and updates their values in the corresponding fields. The Specific Monitor Panel contains four combo boxes that are used to select the variables that are to be monitored. The variables may be chosen from the drop-down lists of each combo box. Upon opening the panel all combo boxes are set to the first variable available in the list. New variables will be read every time a change is made to one of the combo boxes.

An error message will appear on the screen if the selected device does not support the HART® Common Practice Command # 33, which is used to read the device variables. If the specific device does not support this command, the Specific Monitor Panel will continue to show this message and the data contained in the variable fields will not be valid.

## Variable Codes Panel

*Online Only*

(Not for all devices)

The Variable Code Panel is only available to online devices. This panel displays the codes assigned to the Primary, Secondary, Tertiary, and Quaternary variables of the device. If the specific device does not support the HART® Common Practice Command # 50, which reads these device variables, the panels variable fields will contain the text value "Undefined" and a error message similar to the one sent in the Monitor Panel will continue to be displayed. If the device supports the command, the fields will contain the corresponding integer code value held by the online device. *All variables contained in the Variable Codes Panel are read only and may not be altered by the user.*

## Device Status Panel

*Online Only*

The Device Status Panel monitors the status of an online device. If there is a device malfunction it will be reported here, using standard, HART® device errors: Primary Variable Out Of Limits, Non-Primary Variable Out Of Limits, Primary Variable Analog Output Saturated, Primary Variable Analog Output Fixed, More Status Available, Cold Start, Configuration Changed, and Field Device Malfunction. If the status of the online device indicates any of these errors, the corresponding check box will be "checked", or enabled, and the text color will change to red. *All variables contained in the Device Status Panel are read only and may not be altered by the user.*

## Range Panel

The Range Panel includes the following variables: the Upper Range Limit (URL), the Upper Range Value (URV), the Lower Range Value (LRV), the Lower Range Limit (LRL), the Minimum Span, the Damping, the Primary Variable Unit (PV Unit), the Unit Family, the Unit, the Lower Reference Button (Lo - ), and the Upper Reference Button (Hi +). If the device is offline, the URL, LRL, Minimum Span, Lo - , and Hi + variables are not displayed.

The URV, the LRV, and the Damping values can be updated by typing the new values in the appropriate fields. These values must be numeric. The URV, LRV, URV, and LRV have unit labels displayed on the right side of their fields; these unit labels will always correspond to the value contained in the PV Unit field, and will be updated when the PV Unit value is changed. The PV Unit field is changed by selecting a new value from the pull down lists in the Unit Family and then the Unit combo boxes. The Unit Family combo box drop-down list holds the main units (i.e. Temperature, Pressure, etc.). The Unit combo box drop-down list relates directly to the Unit Family value and will change each time the Unit Family value changes. For example, if the Unit Family value is Pressure, the Unit combo box drop-down list will contain inches of water at 68 degrees F, inches of mercury at 0 degrees C, etc. If the Unit Family value is changed to Temperature, the Unit combo box drop-down list will in turn change to Degrees Celsius, Degrees Fahrenheit, etc.

To change the PV Unit value, you must first select the Unit Family from its combo box, then select the Unit value from its combo box. Once this is complete the PV Unit field will be updated to correspond to this value.

When the PV Unit is altered on an online device, the system will prompt you immediately to save your changes, to send these changes to the device select the Yes button.

The URL, LRL, and Minimum Span variables are not editable by the user. The Range Panel of an online device does allow the user to set the lower and upper range reference values though. If the Lo - button is pressed, the Lower Range Reference window will appear on the screen and the user can send this value to the device by pressing the Send button. The user can leave the Lower Range Reference window by pressing the Done button. The same operation may be executed with the Upper Range Reference by pressing the Hi+ button.

## Configuration Panel

When the device contained within this Device Frame is offline, the Configuration Panel contains only the Function variable. This value can be updated from the combo box drop-down list; this list consists of the Transfer Function Codes Table available from the HART® Communication Foundations' Common Tables Specification.

When the device is online, the Configuration Panel includes the Function as well as the Write Protect and Alarm Selection variables. These variables are read only and are not editable by the user.

## Maintenance Panel

*Online Only*

(Not for all devices)

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks, dependent on if the specific device supports those tasks. In the Maintenance Panel, the user may choose from the Self-Test, the Additional Status, the Device Reset, the Loop Test, or the Burst Mode operations.

### Self-Test

Pressing the Self-Test button on the Maintenance Panel first opens a Self-Test confirmation window. Select Yes to proceed, or No to return to the Maintenance Panel and cancel the operation. If Yes is selected, the online device will execute a self-test operation as long as the specific device supports the HART® Common Practice Command # 41. Results of the Self-Test will appear in the Additional Status Panel.

### Additional Status

To open the Additional Status Panel, press the Additional Status button of the Maintenance Panel. The specific device must support the HART® Common Practice Command # 48 in order for this operation to execute properly. This action may require that the Self-Test be run first, the user will be informed of this before the Additional Status Panel appears. If the user would like to run the Self-Test operation first, they should select the Cancel button when prompted.

If there is additional status information received from the device it will be displayed in this panel, the Number Of Response Bytes variable will show the user how much data was received from the device. If there is any additional status, the user will be shown the kind of data received followed by a button with the number of bytes it contains as the buttons text. The user may press this button to open the Device

Specific Status Panel and view the information received from the device. There may be up to four buttons displayed on the Additional Status Panel depending on the amount of data received from the device, they may all be opened and viewed in the same way.

### **Device Reset**

Pressing the Device Reset button on the Maintenance Panel and responding Yes to the confirmation dialog results in an immediate reset of the online device.

### **Loop Test**

Pressing the Loop Test button on the Maintenance Panel and responding Yes to the confirmation dialog prompting the user to enter into fixed current mode opens the Loop Test window .

The Loop Test window displays the Digital and Loop Current variables. The Digital Current is monitored by reading this variable from the online device. The Loop Current field is used to enter a new value and sending that value to the device by clicking the Send button.

To close the Loop Test window and return to the Maintenance Panel, press the Done button.

### **Burst Mode**

If the specific online device supports Burst Mode, it can be enabled or disabled from the Burst Mode window by selecting the desired button. The Burst Mode window can be opened by pressing the Burst Mode button from the Maintenance Panel. The user will be prompted when the Burst Mode is altered to confirm their changes, to send the change to the device press Yes, to cancel the changes press No.

The Burst Mode Command Number appropriate to the specific device can also be selected from the pull down list contained in the combo box and pressing the Send button.

The Burst Mode window will close when the Done button is pressed.

## **Trim Panel**

### *Online Only*

The Trim Panel provides the user access to the Current and Zero Trim functions if supported by the specific online device.

### **Current Trim**

Pressing the Current Trim button of the Trim Panel will open the Current Trim window where the current trim data may be changed. A few dialogs will open first prompting the user to set up the required devices. The control loop must be in manual mode and a multi-meter must be inserted on the line point.

The Current Trim window includes three variables; the Current Trim, which is represented by a combo box where the user may select either 4 or 20 mA to send to the device, the Digital Current, which monitors and displays the device's Loop Current variable, and the Loop Current, which represents the new loop current value that can be entered by the user and sent to the device by pressing the Send button.

Pressing the Send button forces the online device to acknowledge these changes and pressing the Done button will close the Current Trim Window.

## Zero Trim

Pressing the Zero Trim button on the Trim Panel opens the Zero Trim window and performs a Zero Trim operation on the online device. The Zero Trim Panel contains the Value variable which represents the devices' current primary variables' value. Once this value has reached the desired value, the user can press the Send button to execute the Zero Trim operation. The user will be prompted to reconfirm their decision on performing this operation before it is actually executed. Pressing the Done button closes the Zero Trim window and aborts the operation.

## Multidrop Panel

*Online Only*

The Multidrop Panel is used to change the polling address of the online device. The Multidrop Panel contains a Polling Address combo box containing the values 0 through 15, representing potential new addresses for the device. Pressing the Change Polling Address button executes the change. The HART Network Frame will display the new address of the device immediately following the send command, which completes the operation.

## Graphics Panel

*Online Only*

The Graphics Panel is only displayed for online devices. The Graphics Panel can be divided into three parts; the actual graph, the monitoring variables, and the editing portion. The monitoring variables are the variables which will be graphed and monitored when the Start Graphing button is pressed, the user may choose to monitor the Primary Variable of this device, the PV Percentage, or the Loop Current. These variables may be chosen by selecting the appropriate check box located in the Choose Values box on the right hand side of the panel. Once the desired variable is chosen, its' current value will be displayed in the push button of the Edit Values box located at the bottom of the panel. Time intervals, as well as minimum and maximum values, may also be adjusted in this box by selecting the desired values from the corresponding combo boxes.

Once the user has selected the variable to be monitored and adjusted the graph values to their specific requirements, they only need to press the Start Graphing button to see the current value of the selected variable is being logged on the graph. This process may be terminated at any time by simply pressing the Stop button. Once the graphing process has started, the user is unable to edit any of the chosen variables without starting the process over again. If the user tries to edit any of these values, the Graphics Panel will send them a message informing them that their action will terminate the graph process, from here they can choose to continue with the current process or cancel it and start over.

When the graphing process has ended, or during the process, the user may view a log created by the Graphics Panel by simply clicking on the variable's button located on the Edit Values section of the panel.

This log contains the log time, the variable selected and its' value at each step of the graphing process. The graph log may be printed, saved to a text file, or converted to a standard comma separated values file by using the graph log panels File menu.

This option can be very helpful if the user would like to analyze a device's variable value for any length of time. The graphing process will continue for the extent of the selected graph time as long as this panel is left in focus and the user does not make any changes to the graph values.

## Notes Panel

### *Offline Only*

The Notes Panel is used to store reference notes made by the user about the offline device. This panel will keep these notes until they or the device are deleted. The date and time are automatically inserted in front of each note. To save an entered note to the file, the Save button of the Device Frame should be pressed before closing the offline device.

## Shortcut Keys

The SmarConf™ HART® Configurator Software gives the user the option of either clicking on menu options or using shortcut keys. The basic rule for the shortcut keys are main menus and buttons on panels with an underlined letter may be selected by the Alt + the underlined letter keys, for example, to open the File menu of the main menu bar using the shortcut key the user would hit the Alt + F keys simultaneously. Once a menu bar is opened, the options offered in that menu may be selected by simply pressing the underlined letter of that option, for example, the Auto Poll option can be selected or deselected by first pressing Alt + S to open the Settings menu and then A to select the Auto Poll option. The power user commands can be selected without opening the options menu bar, these commands can be executed by simply pressing Ctrl + the underlined letter simultaneously. For example, to exit the SmarConf™ application, the user may select the Ctrl + X keys simultaneously, instead of choosing this option from the main File menu.

ACE="Arial">

### Power User Commands

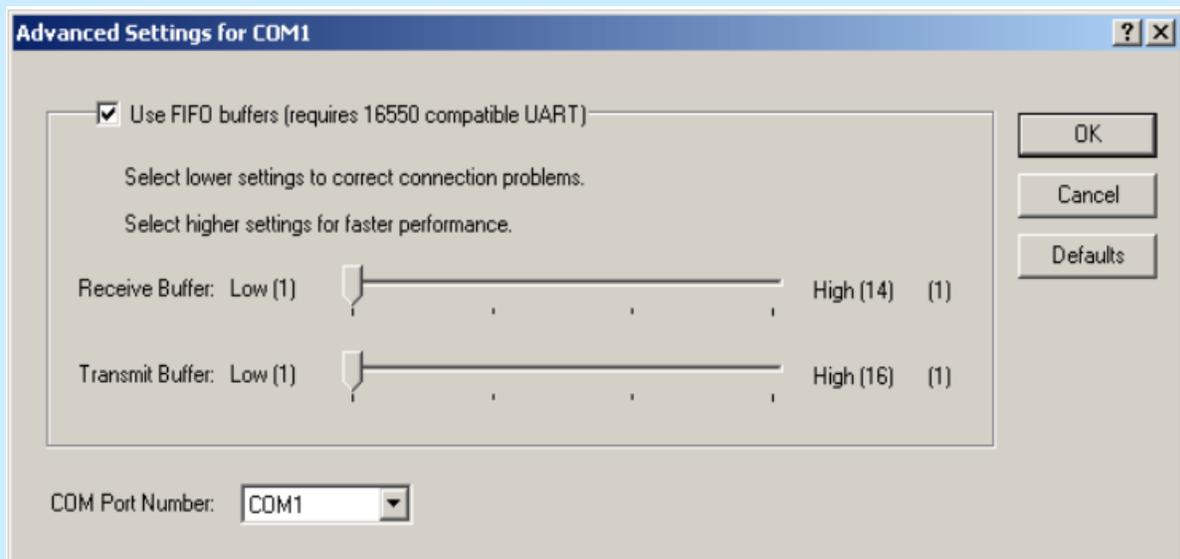
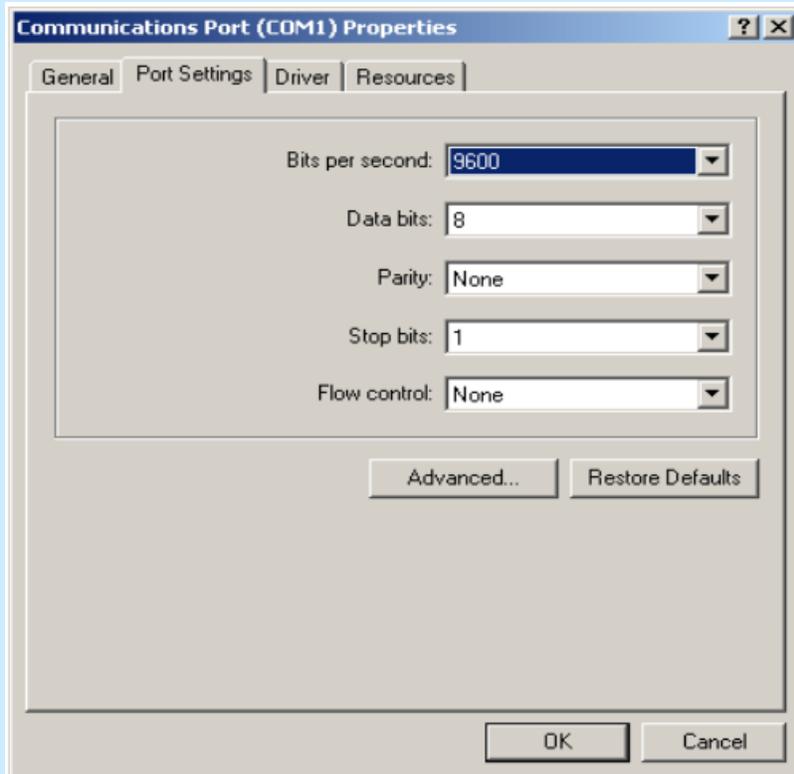
<b>File Menu Option</b>	<b>Power User Keys</b>
Open a new offline device	Ctrl + N
Open an offline device from file	Ctrl + O
Close the currently selected device	Ctrl + C
Save the currently selected device	Ctrl + S
Save the selected device to a new file	Ctrl + V
Import a HPC301 database file	Ctrl + I
Open the Polling Window	Ctrl + P
Open the HART Network Window	Ctrl + H
Exit the SmarConf™ Application	Ctrl + X
Open the Communication Port Window	Ctrl + M
Open the Look & Feel Window	Ctrl + L

Open the HART Serial Monitor	Ctrl + R
Open the Help Window	Ctrl + T
Open the About Window	Ctrl + B
Close the HART Serial Monitor	Ctrl + E

## Changing the Communications Port for Enhanced Settings

If you are using the SmarConf™ application with a network using the burst HART® feature or another Master HART® communicator online, it is required that you change from the default communication port settings to the enhanced communication port setting to allow a smooth interaction with the line.

1. From the Start menu, Select "Settings" -> "Control Panel".
2. Select the "System" option.
3. Select the "Hardware" tab.
4. Select the "Device Manager" button.
5. Choose the communication port currently used for the SmarConf™ application. Right click to open the pop up menu.
6. Select the "Properties" option.
7. Select the "Port Settings" tab. Ensure the settings match the "Communications Port Properties" screen shot below. (The screen shot may vary from computer and operating system but the main components are basically the same.
8. Continue by selecting the "Advanced" button and ensure the settings match the "Advanced Settings for \*\*\*\*\*" screen shot below the port settings screen shot where "\*\*\*\*\*" should be equal to the port the user is configuring.



## Smar LD301/LD291 Device Frame

If the SmarConf™ HART Configurator finds a Smar LD301/LD291 Device located on your HART Network, the application will display this device with its specific variables in a LD301/LD291 Device Frame.

An Offline LD301/LD291 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar LD301/LD291 device type.

## **LD301/LD291 Device Panels**

Device Panels that are contained within a Smar LD301/LD291 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Datasheet Panel,
- the Monitor Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),
- the Range Panel,
- the Configuration Panel,
- the Table Panel,
- the User Unit Panel,
- the Totalization Panel (not applicable to the LD291),
- the PID Settings Panel (not applicable to the LD291),
- the LCD Indicator Panel,
- the Maintenance Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## Information Panel

The Information Panel of an online Smar specific device differs from the generic Information Panel in only two ways. The online Information Panel contains the Ordering Code variable, which is not editable by the user, and the offline Information Panel will contain the specific value of the device, for example "LD301" or "FY301", dependent on the device, in its Type field.

Please refer to the generic Information Panel description in the Generic Device Frame section for more specifics of this panel.

## Datasheet Info Panel

The Datasheet Info Panel of an online device contains three sections; the Sensor Information, the Remote Seal Information, and the Flange Information section.

The Sensor Information section contains the Sensor Type, the Sensor Fill Fluid, the Sensor Diaphragm, and the Sensor Range variables. *The Sensor Information variables are read-only and can only be viewed by the user.*

The Remote Seal Information section contains the Remote Seal Type, the Remote Seal Fill Fluid, the Remote Seal Diaphragm, and the Remote Seal Quantity variables. The user may change any of the Remote Seal variables by selecting the new desired value from each fields' drop-down list.

The Flange Information section contains the Flange Type, the Flange Material, the Flange O-Ring, and the Flange Drain/Vent variables. The user may edit the Flange Information variables, like the Remote Seal variables, by selecting the new desired value from the appropriate fields' drop-down list.

The Datasheet Info Panel of an offline device differs from an online device only in the Sensor Information section. An offline devices' Sensor Information section variables will all contain the value "n/a", since these variables are read only on an online device, these variables are not applicable to an offline device. The Remote Seal and Flange Information variables may be changed by selecting the new desired value from the appropriate fields drop-down list.

## Configuration Panel

The Configuration Panel contains the Function and the Alarm Selection variables, when the device is offline. This Function value can be updated from the combo box drop-down list and the Alarm Selection value can be updated by selecting the desired push button. The Alarm Selection value may be toggled between High and Low and the Function options include Linear, Square Root, Square Root Third Power, Square Root Fifth Power, Table, Square Root + Table, Square Root Third Power + Table, or Square Root Fifth Power + Table.

The Configuration Panel also includes the Write Protect variable when the device is online. This variable may also be updated by pressing the desired push button. The Write Protect value may be toggled between Enabled and Disabled.

## **Table Panel**

The Table Panel contains the same variables whether the device is offline or online. The Table Panel contains the Number of Points, which may contain the value 2 through 16, this value may be selected from the drop-down list. The Number of Points variable directly reflects on the number of X and Y table points shown on the panel. The X and Y table point fields may be updated by selecting the text in the desired field and entering the desired value. The X table points may contain values from -6400 through 6400, but they must be entered consistently in either ascending or descending order. The Y table points may contain values from -0.625 through 106.25, these values do not need to be entered in any particular format. The edited values may be stored to a file by pressing the Save button, for an offline device, or sent directly to the online device by pressing the Send button.

## **User Unit Panel**

The User Unit Panel contains the same variables whether the device is online or offline. The User Unit Panel contains the User Unit Mode variable which can be turned On or Off by selecting the corresponding push button. When changing the User Unit Mode, you will be prompted to confirm your change before it is sent to the online device or stored to file.

The PV variable field is not editable by the user but if the device is online, the PV variable will be monitored and displayed. If the device is offline this field will hold the value "n/a" since this variable is not applicable when the device is offline.

The User Unit value can be updated by the user by first selecting the Unit Family value desired by choosing from the drop-down list. If the value selected is "Special", there is no need to pick a Unit value since the User Unit text field will become editable and you may type the desired text into the field. If another Unit Family selection is made, the user may then select the desired Unit value from the drop-down list and this new User Unit value will be displayed in the Unit field as well as the E.U. (0%) and E.U. (100%) unit codes. If the User Unit mode is on and the device is online, this new User Unit value will also be displayed as the PV unit code.

The E.U. (0%) or lower user unit value and E.U. (100%) or upper user unit value are editable by the user as long as the value entered is a valid numeric value.

## **Totalization Panel**

*LD301 Only*

The Totalization Panel is available for online or offline LD301 devices and includes the Totalization Mode, the Total value, the Total Unit value, the Maximum Flow value and the Factor variables. The Totalization Mode may be turned On or Off by the user simply by selecting the corresponding push button. When changing the Totalization Mode, you will be prompted to confirm your change before it is sent to the online LD301 device or stored to file.

The Total value is monitored when working with an online device, but not applicable when the device is offline. The value "n/a" will be displayed if the LD301 device is offline.

The Total Unit value can be updated by first selecting the Unit Family value from its available options and then selecting the desired Unit from the available drop-down list. If the value "Special" is chosen from the Unit Family combo box, the user may type in the new desired value into the Total Unit text field, otherwise this field is not editable by the user and will only display the value chosen from the combo boxes. Once the Total Unit value is selected, the display of the Total unit code will correspond to this new value.

The Totalization Maximum Flow and Totalization Factor text fields are editable by the user if the Totalization Mode is Off and the user enters a valid numeric value. When the Totalization Mode is On, these variables are no longer editable by the user, whether the device is online or offline. When working with an online LD301 device, the user may choose to reset the Totalization of the device, this is accomplished by selecting the Reset Totalization button located at the bottom of the LD301 Totalization Panel.

## **PID Settings Panel**

### *LD301 Only*

The PID Settings Panel is available for both the offline and online Device Frame. The variables contained in the PID Settings Panel are the Controller Mode (PID), the Set Point Tracking (SP Tracking), the Engineering Unit, the Action Mode (Action), the PID Mode (Mode), the Set Point (SP), the Process Variable (PV), the Manipulated Variable (MV), the Error, the Proportional Factor (KP), the Integral Time (TR), the Derivative Time (TD), the Safety Limits button, and the PID Graphics button.

The Controller Mode can be updated by pressing the desired push button, either On or Off. When this value is changed, the user will be asked to confirm this change, and the new value will be sent to the device if online. If the device is offline, the Save button should be pressed in order for the change to be acknowledged. If the Controller Mode is Off, all variables contained in the PID Settings Panel become read only, if the user tries to edit any values, the Controller Mode is Off dialog will appear on the screen, press the OK button to remove it.

The SP Tracking check box may be toggled on or off by checking or un-checking it, this change will require a confirmation by the user. When the SP Tracking variable is on, checked, the SP variable is read only. The SP Tracking variable can not be turned on when the PID Mode is set to Auto, if the PID Mode is set to Auto and the user tries to toggle the SP variable, a PID Mode is Automatic dialog will appear on the screen, press OK to remove it.

The Engineering Unit is disabled in the offline PID Settings Panel, but in the online panel this variable may be updated by checking or un-checking its' check box. When the Engineering Unit is on, checked, the SP and PV variables' unit labels will contain the User Units' Unit value rather than the percentage unit which will be displayed when the Engineering Unit is off.

The Action variable can contain the value Direct or Reverse and these values may be changed by simply selecting the desired push button. The user will be asked to confirm changes before the new value is sent to the device, if the device is offline the changes will only be stored by pressing the Save button. The PID Mode variable may be edited as well by selecting the new desired value of Auto or Manual and pressing the appropriate button. A Change PID Mode dialog will appear on the screen prompting the user to confirm this change. The Manipulated variable will become editable when the PID Mode is in Manual and read only when in Auto. The SP Tracking variable will automatically be turned off when the PID Mode is set to Auto, this will in turn set the SP variable to editable if it was not already. The rest of the variables, when editable, may be updated by entering the new numeric value into their corresponding fields'. The KP variable value must be between 0 and 100, the TR and TD variable values must be between 0 and 999, and the MV must be between the Low Limit and High Limit value variables of the Safety Limits Panel.

If the LD301 devices' software version is 5.14, 5.15, 6.02 or later, the PID Panel will also contain a PID Output Table Button and a Table Enabled checkbox. This PID Output Table can be enabled or disabled by toggling the Table Enabled checkbox, you will be prompted to confirm your change. The PID Output Table panel will open when the PID Output Table button is pressed.

## **Safety Limits Panel**

When the Safety Limits button of the PID Settings Panel is pressed, the Safety Limits Panel will appear on the screen. This panel holds the Safety Out, the Out Rate Change, the Low Limit, the High Limit and the SP Power On variables. These variables are read only when the Controller Mode is Off, but editable when it is On.

Selecting the Auto, Manual, or Last Mode push button will change the SP Power On variable, the Change SP Power On dialog will appear prompting the user to confirm this change. The rest of the variables may be updated by entering the new numeric value into the corresponding field. If the value entered is out of the valid range for that variable, the Value Out Of Range dialog will appear on the screen showing the user the values that may be entered into the field. The Out Range Change variable may contain the values 0.0 through 600.0, the Low and High Limit variables may contain the values  $-0.625$  through 106.25.

When finished with this panel, pressing the Done button will remove it from the screen and return to the PID Settings Panel.

## PID Graphics Panel

When the PID Graphics button of the PID Settings Panel is pressed and the device is online, the PID Graphics Panel will appear on the screen. This panel can not be opened if the PID Mode of the PID Settings Panel is Off. This panel contains a main section, where the graph panel is located, a button section, which is located to the right of the graph panel, and an edit values section, which is located at the bottom of the panel below the main section.

The main section of this PID Graphics panel is where the actual graphing will be displayed. This section contains the value measurement along the Y-axis of the graph, the time measurement along the X-axis of the graph, and variables to manipulate these X and Y values below the graphing display area. The Graph Time (measured in minutes) may be altered by either selecting a value from the drop-down list, the available options are 1 through 10, or by typing in the new desired value as long as this value is a whole number.

When the Edit Graph Values button, located in the main section of the PID Graphics panel, is pressed the Edit Graph Values dialog will open on the screen. This panel will allow the user to change the Interval Time (in seconds) of the graph by either selecting an option from the drop-down list or typing in the desired value, this value must be a whole number. The interval time is the time span, in seconds, that the graph will wait before updating the display. The Min and Max Value variables may also be edited in the same way, either by selecting a value from the appropriate drop-down list or manually typing in the new desired value, again this must be a whole number but negative numbers are allowed. The Min Value will be displayed as the lowest point of the Y-axis and the Max Value will be displayed as the highest point of the Y-axis. These variables may be updated at any time during or after a graphing session but may not be altered during. The graphing session is started by pressing the Start Graphing button located in the main section of the PID Graphics panel and may be stopped before the graph time has expired by pressing the Stop button.

The edit values section of the PID Graphics panel contains the SP, the PV, the MV, the KP, the TR, the TD, the PID and the SP Tracking variable buttons. These variable buttons will display the current value of the variable held by the device and when pressed will allow the user to edit this variable at any point during or before a graphing session. The SP button will display the set point value from the device in yellow to correspond to the set point value displayed in the graph panel of this panel. When this button is pressed by the user, the Edit Set Point Value dialog will open where the user may change the value and send this new value directly to the online device.

If the SP Tracking variable is On, the set point value is read only, and the user will be informed that this variable is no longer editable if they try to make a change. The PV button will display the process variable value from the device in green to correspond to the process variable value displayed in the graph portion of this panel. This variable is not editable by the user, when this button is pressed the user will be informed that this variable is read only.

The MV button will display the manipulated variable value from the device in blue to correspond to the manipulated variable value displayed in the graph of this panel. When this button is pressed by the user, the Edit Manipulated Value dialog will open where the user may edit the

variable and send this new value directly to the online device. If the PID Mode is set to "Auto", the manipulated variable value becomes read only, and the user will be informed that this variable is no longer editable if they try to change it.

The KP, TR, and TD buttons will display the corresponding variable value from the device in black, these variables are not displayed in the graph of this panel, only on the button face. When these buttons are pressed by the user, the appropriate Edit Value dialog, similar to the ones for the SP, PV, and MV variables, will open where the user may edit the variable and send this new value directly to the online device.

The PID Mode button will display the current PID Mode of the online device. When this button is pressed by the user, the Change PID Mode dialog will open where the user may choose to change from "Auto" to "Manual", or from "Manual" to "Auto", whichever the case may be. If the SP Tracking mode is currently On when the PID Mode is set to "Manual", the SP Tracking mode will automatically be turned Off.

The SP Tracking button will display the current SP Tracking mode value of the online device. When the user presses this button, the Change SP Tracking dialog will open where the user may choose to change from "On" to "Off", or vice-versa. If the PID Mode value is set to "Auto" when the user presses the SP Tracking button, they will be informed that this action is not possible at this time.

After or during a graph session, the user may choose to view the list of variable values that have accrued during the graphing process. This may be accomplished by pressing the View Trending button located in the right portion of the PID Graphics panel. The dialog that is opened shows the logged values of the SP, PV, and MV variables preceding the date and time of that graph reading. This log may be printed to your local printer, saved as a new text file, or exported to a .csv file by selecting the desired option from the File menu contained in this dialog.

To return to the PID Settings Panel, press the Done button.

## **PID Output Table Panel**

When the PID Output Table button of the PID Settings Panel is pressed and the LD301 device is online, the PID Output Table Panel will appear on the screen. This panel can not be opened if the PID Mode of the PID Settings Panel is Off. This panel behaves similarly to the Table Panel, for more information about editing and/or viewing these variables please refer to the Table Panel section of this manual.

To send the edited variables of this panel to the online LD301 device, press the Send button. This panel can be closed by pressing the Done button.

## LCD Indicator Panel

The LCD Indicator Panel is available for both the offline and online Device Frame. The LCD Indicator Panel includes the Display 1<sup>st</sup>, Display 2<sup>nd</sup>, and the LCD Display variables. The user may update each of these variables by selecting the new desired value from the appropriate combo boxes' drop-down list. The device will recognize these new values when the Send button is pressed, if the device is online, or the Save button is pressed, if the device is offline.

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Device Reset, the Loop Test, the Operations Counter, the Passwords, the Write to Transducer, or the Read from Transducer operations.

### Device Reset

Refer to the generic Maintenance Panel description of the Generic Device Frame section for more information on the Device Reset operation.

### Loop Test

Refer to the generic Maintenance Panel description of the Generic Device Frame section for more information regarding the Loop Test procedure.

### Operations Counter

Pressing the Operations Counter button on the Maintenance Panel opens the Operations Counter Panel. The Operations Counter panel is a read only panel. The user may only view the variables contained in this panel. This panel displays the number of times a particular operation has been executed, this value will be displayed to the right of the operations' name.

The LD301 Operations Counter Panels' operations include the number of times the lower or upper range values have been changed, the current trim command has been executed with 4, and with 20 mA, the zero trim command has been executed, the upper trim and the lower trim commands have been executed, the PID mode has been changed, the function variable has been changed, the characterization trim command has been executed, the Multidrop command has been executed, the password level has been changed, and the totalization mode has been changed.

The LD291 Operations Counter Panels' operations include the number of times the lower or upper range values have been changed, the current trim command has been executed with 4, and with 20 mA, the zero trim command has been executed, the upper trim command has been executed, the function variable has been changed, the characterization trim command has been

executed, the Multidrop command has been executed, the password level has been changed, and the write protect mode has been changed.

The Done button should be pressed by the user to remove the Operations Counter Panel from the screen and return to the Maintenance Panel.

## **Passwords**

Pressing the Passwords button on the Maintenance Panel opens the Password Level Panel. The Password Level Panel consists of a number of combo boxes, each containing the values 0 through 3, and a Change Password button. Each combo box represents a different panel found in the Device Frame and its' current password level.

The LD301 Password Level Panel contains the current password level of the Information Panel, the Configuration Panel, the PID Settings Panel, the Trim Panel, the Maintenance Panel and the Totalization Panel.

The LD291 Password Level Panel contains the current password level of the Information Panel, the Configuration Panel, the Trim Panel, and the Maintenance Panel.

The user may change these levels by selecting the new desired value from the associated combo box and pressing the Send button.

To close the Password Level Panel and return to the Maintenance Panel the user simply needs to press the Done button.

The user may change the actual password of each password level by pressing the Change Passwords button of the Password Level Panel. After pressing this button the Password Panel will appear. The Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online device by pressing the Send button. To close the Password Panel and return to the Password Level Panel, press the Done button.

## **Write To Transducer**

Pressing the Write to Transducer button on the Maintenance Panel first opens a Transfer Data confirmation window. Select Yes to proceed with the operation, or No to return to the Maintenance Panel.

## **Read From Transducer**

Pressing the Read from Transducer button on the Maintenance Panel first opens a Transfer Data confirmation window. Select Yes to proceed with the operation, or No to return to the Maintenance Panel.

## Trim Panel

*Online Only*

The Trim Panel provides the user access to the Current, the Temperature, the Zero, the Lower, the Upper and the Characterization Trim functions.

### Current Trim

Pressing the Current Trim button of the Trim Panel will open the Current Trim window where the current trim data may be updated by the user. For more information on this procedure, please refer to the generic Trim Panel's Current Trim description located in the Generic Device Frame section.

### Temperature Trim

Pressing the Temperature Trim button on the Trim Panel opens the Temperature Trim Panel. The Temperature Trim Panel consists of two variables, the Value and the New Value; the Value is the current temperature of the online device which is monitored and updated accordingly, the New Value is where the user should enter the desired temperature value. The user may press the Send button in order to execute the Temperature Trim operation or the Done button which will close the Temperature Trim Panel.

### Zero Trim

Pressing the Zero Trim button on the Trim Panel opens the Zero Trim Panel and performs a Zero Trim operation on the online device. Please refer to the generic Trim Panel's Zero Trim description in the Generic Device Frame section for more information about this procedure.

### Lower Trim

Pressing the Lower Trim button on the Trim Panel will first send the user a message prompting them to apply the lower range input, once the OK button is pressed the Lower Trim Panel will open. The Lower Trim Panel consists of the Value variable, which is the devices' current primary variable value, this variable is monitored and updated accordingly. The New Value field is where the user should enter their new desired value. The user can press the Send button to execute the Lower Trim operation on the device. The user will be prompted to reconfirm their decision to perform this operation before it is executed on the online device. Pressing the Done button will close the Lower Trim Panel.

### Upper Trim

The user may perform an Upper Trim operation on the online device by pressing the Upper Trim button located on the Trim Panel; similarly to the Lower Trim option, the user will be prompted to apply the upper range input. When the user selects OK, the Upper Trim Panel will open. The Upper Trim Panel consists of the Value variable, this is the devices primary variables' current

value, it is monitored and updated accordingly. The New Value field is where the user should enter the new desired value. The user can press the Send button to execute the Upper Trim operation on the online device. The user will be prompted to reconfirm their decision to perform this operation before it is executed on the device. Pressing the Done button will close the Upper Trim Panel.

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## **Characterization Trim**

A Characterization Trim can be started on the online device by pressing the Characterization Trim button on the Trim Panel. Although the characterization trim is a bit more complex than the previous trim operations, it is still relatively simple with the SmarConf™ HART Configurator. After the user chooses to perform this function, they will be prompted with a few messages directing the correct procedural steps for this operation. The first will ask the user to reconfirm their decision to advance with this process, at this point, and at any other time during the execution, the operation may be aborted by selecting the No or Cancel button. If the user has chosen to proceed, the SmarConf™ HART Configurator will prompt the user to connect the device to an accurate pressure standard. Finally, the user will be asked to apply pressure to the sensor, once these steps are taken care of the Characterization Trim Panel will open.

The Characterization Trim Panel monitors and displays the Lower Range Value, the Upper Range Value and the Primary Variable for the user. The first point will contain the current value of the primary variable in the Measured Value field; the user is expected to enter the new desired value in the Actual Value field. Once this is complete, the user should press the Send button to register this new value to the device. Again, the user will be prompted to apply pressure to the sensor. Once complete, the first points' Actual Value will contain the previous value entered by the user, the second point will contain the current value of the primary variable in the Measured Value field, and the Actual Value field will be editable for the user to type in the next value.

The Send button, which is now located next to the second points Actual Value field, should be pressed for the new value to be registered with the device. The characterization trim needs a minimum of two points; since the minimum has been achieved, the user will be asked if they would like to enter more points.

If the user chooses to enter more points, the above process will continue up to the fifth point or when the user has entered the desired amount of points. If the user enters a value that is smaller than the previous points actual value, the user will be asked to reenter the value. Once the user has entered all five points, or the desired amount of points, they should press the Send button to complete the operation. If the user presses the Cancel button, the operation will be terminated and the user will be returned to the Trim Panel.

## **Graphics Panel**

*Online Only*

The Graphics Panel is only available for online devices. This panel contains a main section, where the graph panel is located, a choose values section, which is located to the right of the graph panel, and an edit values section, which is located at the bottom of the panel below the main section.

The main section of this Graphics panel is where the actual graphing will be displayed. This section contains the value measurement along the Y-axis of the graph, the time measurement along the X-axis of the graph, and variables to manipulate these X and Y values below the graphing display area. The Graph Time (measured in minutes) may be altered by either selecting a value from the drop-down list, the available options are 1 through 10, or by typing the new desired value directly into the field as long as this value is a whole number. When the Edit Graph Values button, located in the main section of the Graphics panel, is pressed the Edit Graph Values dialog will open on the screen.

This panel will allow the user to change the Interval Time (in seconds) of the graph by either selecting an option from the drop-down list or typing in the desired value, this value must be a positive whole number. The interval time is the time span, in seconds, that the graph will wait before updating the display. The Min and Max Value variables may also be edited in the same way, either by selecting a value from the appropriate drop-down list or manually typing in the new desired value, again this must be a whole number but negative numbers are allowed. The Min Value will be displayed as the lowest point of the Y-axis and the Max Value will be displayed as the highest point of the Y-axis. These variables may be updated at any time during or after a graphing session but may not be altered during. The graphing session is started by pressing the Start Graphing button located in the main section of the Graphics panel and may be stopped before the graph time has expired by pressing the Stop button.

The choose values section of the Graphics panel contains the First, Second, Third and Fourth Variable combo boxes. This is where the user may select which variables from the online device they would like to monitor and graph. The user may select these values by choosing the desired variable from the available drop-down list options. If only one variable is desired for graphing, the user may select or leave the "None" value selected for the rest of the variables. This selection must be done before the start of a graphing session, not during, if the user changes a variable while the graphing session is active, they will be prompted that if they make this change they will need to restart a new graphing session.

The edit values section of the Graphics panel contains four variable buttons. These buttons correspond directly with the four combo boxes that are available to select the graphing variables. These variable buttons will display the current value of the selected variable value held by the device and when pressed will show the user a dialog that contains the logged values of the chosen variable preceded by the date, time and interval span of that graph reading. This log may be printed to your local printer, saved as a new text file, or exported to a .csv file by selecting the desired option from the File menu contained in this dialog.

The first variable chosen by the user will display the color blue as its' graphing line and blue will be the color of the first variable button contained in the edit values section of this Graphics panel. The second variable chosen by the user will display the color green as its' graphing line and

green will be the color of the second variable button contained in the edit values section. The third variable chosen by the user will display the color purple as its' graphing line and as the color of the third variable button. Finally, the fourth variable chosen by the user will have a graphing line and fourth variable button displaying the color yellow.

## **Smar TT301 Device Frame**

If the SmarConf™ HART Configurator finds a Smar TT301 Device located on your HART Network, the application will display this device with its specific variables in a TT301 Device Frame.

An Offline TT301 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar TT301 device type.

## **TT301 Device Panels**

Device Panels that are contained within a Smar TT301 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),
- the Range Panel,
- the Configuration Panel,
- the Sensor Panel,
- the Table Panel,
- the Alarm Panel,
- the PID Settings Panel,
- the LCD Indicator Panel,
- the Maintenance Panel (online only),
- the Trim Panel (online only),

- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## Configuration Panel

The Configuration Panel is contained in both the offline and the online TT301 Device Frame. The offline Configuration Panel variables include the Burnout Mode (Burnout), which may be toggled between High and Low, and the Function variable, which is read only and may not be edited by the user. The online Configuration Panel contains the Burnout Mode and the Function variables, which behave similarly whether online, or offline, and the Write Protect variable, which may be toggled between Disabled and Enabled. Any changes made to the online Configuration Panel are sent immediately to the device upon confirmation from the user.

## Sensor Panel

The Sensor Panel is contained in both the offline and the online TT301 Device Frame, both panels behave similarly and contain the same variables. The Sensor Panel variables include the Current Sensor, which is a read only variable. The Sensor Type, the Sensor, and the Connection can be updated by selecting a new value from the corresponding combo boxes' drop-down list. The Type combo box list will always stay the same but the Sensor and Connection combo box lists correspond directly to the Type value. On the Sensor Panel, the drop-down lists are not the only variables that change according to the Type of Sensor, there are two variables which are not shown unless the Type is a specific one. One of these dynamic variables is the Cold Junction Mode, this variable is added to the panel when the Type contains the value TC, mV, or Special. The Cold Junction may be toggled between Enabled or Disabled. The other variable that will be added to the Sensor Panel is the Configure Special Sensor button, this button is only added when the Type contains the value Special. When the Configure Special Sensor button is visible on the screen, the Connection variable will be removed from the screen. If the user presses this button, the Special Sensor Panel will open.

## Special Sensor Panel

The Special Sensor Panel is opened when the Configure Special Sensor button is pressed on the Sensor Panel. The Special Sensor Panel variables include the Range, the Connection, the Table button, the Sensor Unit, the Unit Family, the Unit, the Upper Range Limit, the Lower Range Limit, and the Minimum Span. The user may alter the URL, LRL and Minimum Span simply by typing in the desired value into the corresponding field. The Sensor Unit field is read only but this variable may be changed by first selecting the type from the Unit Family combo box list, and then selecting the Unit from the Unit combo box list. The Unit field, as well as the URL, LRL and Minimum Span unit labels will be automatically updated. The Special Sensor Unit field behaves very much like the Unit field of the Range Panel. The Range and Connection variables

of the Special Sensor Panel may be updated by selecting the new desired value from the appropriate combo box drop-down list. The Special Sensor Panel can be closed by pressing the Done button. The user will be prompted to save their changes if the Done button is pressed and the changes have not been sent or saved to the TT301 device, this operation may be completed by pressing the Send/Save button.

## Special Sensor Table Panel

If the user presses the Table button contained in the Special Sensor Panel, the Special Sensor Table Panel will open for the user to view and/or edit.

The Special Sensor Table Panel contains the same variables whether the device is offline or online. The Special Sensor Table Panel contains the Number of Points, which may contain the value 2 through 16, this value may be selected from the drop-down list. The Number of Points variable directly reflects on the number of X and Y table points shown on the panel. The X and Y table point fields may be updated by selecting the text in the desired field and entering the new desired value. The X table points may contain values from -6400 through 6400, but they must be entered consistently in either ascending or descending order. The Y table points may contain values from -0.625 through 106.25, these values do not need to be entered in any particular format. The edited values may be stored to a file by pressing the Save button, for an offline device, or sent directly to the online device by pressing the Send button. The Special Sensor Table Panel will close when the Done button is pressed.

## Alarm Panel

The Alarm Panel is contained in both the offline and the online Device Frame. The Alarm Panel contains three sections, the Alarm 0 section, the Alarm 1 section, and the Alarm 2 section. The Alarm 0 section contains the mode of this alarm which may be toggled On or Off. The Alarm 0 section also contains an Acknowledge Alarm 0 button, this button is disabled if the device is offline. If this is an online device and the user presses this button, the command to acknowledge this alarm will be sent to the device. The Status of this alarm can be viewed from its status field found on the right side of the Alarm 0 section. For an offline device, this field will always read "n/a", not applicable because the status of this alarm can not be acknowledged when it is offline. If the device is online, the Status may read "Off", "No Alarm", "Acknowledged", or "Not acknowledged" depending on the alarms' status.

The Alarm 1 and Alarm 2 sections are similar to the Alarm 0 section in that they also contain the Alarm mode, the Acknowledge Alarm button, and the Alarm Status. These variables behave similarly in all alarm sections. The Alarm 1 and Alarm 2 sections also contain a Limit variable that the user may edit by entering the desired value into the corresponding field. The Alarm 1 and Alarm 2 mode is somewhat different from the Alarm 0 mode; Alarm 1 and Alarm 2 can be toggled between the values Off, High, and Low, rather than just On and Off. Similarly to the Alarm 0 section, the Alarm 1 and Alarm 2 Acknowledge buttons and Status fields are disabled when the device is offline. If this is an online Alarm Panel, the user may use the Acknowledge All button to acknowledge Alarms 0, 1 and 2 rather than using the single Acknowledge Alarm

buttons three separate times. If the user changes either the Limit 1 or Limit 2 field, they must send this change to the device by pressing the Send Limits button contained in the Alarm Panel.

## **PID Settings Panel**

The PID Settings Panel is contained in both the offline and the online TT301 Device Frame. The PID Settings Panel contains the Controller Mode, the Valve Action Mode, the Set Point Tracking, the PID Mode, the Set Point Generator Mode, the Set Point Time Mode, the Set Point Time, the Set Point Table button, the Set Point, the Process Variable, the Manipulated Variable, the Error, the Limits and Tuning button, and the PID Graphics button.

The online and offline PID Setting Panel behave similarly except the offline devices' PV and Error variables are disabled. When changes are made to the push button variables, an offline device will still need to be saved while online devices will send the appropriate command immediately.

The Controller Mode (PID) variable may be toggled between On and Off. If the Controller Mode is Off, none of the variables of the PID Settings Panel or the Limits and Tuning Panel may be updated and any attempt to update them will result in a message informing the user to turn the PID On first. The Action variable may be toggled between Direct and Reverse, the SP Tracking can be enabled by checking this field or disabled by un-checking it. When the SP Tracking is enabled, the SP variable, as well as the SP Generator Mode, are no longer editable. The PID Mode may be toggled between Auto and Manual, when this mode is Auto the MV variable is no longer editable. The SP Generator may be toggled between On and Off, and the SP Time Mode can be toggled between Run and Pause. If the SP Generator mode is On, the variables with field entries (SP, PV, MV, and Error) are no longer editable. When the SP Time Mode is Pause, the SP Time field is the only field that is editable. When the SP Time Mode is Run, none of these variables are editable, but they will be updated according to the SP Table. If the device is offline, the PID Graphics button will be disabled.

## **Limits and Tuning Panel**

The Limits and Tuning Panel can be opened for the user to view and edit various PID Settings of the TT301 device by selecting the Limits and Tuning button from the PID Settings Panel. The Limits and Tuning Panel is available on both offline and online TT301 Device Frames.

The variables contained in the Limits and Tuning Panel include the Set Point Power On, which is the mode the device will automatically go into after a power failure. The Set Point, another variable kept in RAM memory by the device, is also included in this panel. The proportional factor (KP), the integral time (TR), and the derivative time (TD) are shown in the Limits and Tuning Panel. Also displayed are the Safety Out, the maximum rate of change (Out Rate\_Change), the Low Limit and the High Limit, all of which refer to the Manipulated Variable of this TT301 device. All variables contained within this panel are editable, except in the case when the PID Controller Mode is set to Off. In this case, mimicking the PID Settings Panel, all variables are available for viewing but no editing may take place. The Out Rate\_Change

variables value must be between 0 and 600, the Low and High Limit values must be between -0.625 and 106.25, the TD and TR variable values must be between 0 and 900, and the KP value must be between 0 and 100.

The SP Power On variable may be updated by merely pressing the desired push button, either Auto, Manual, or Last Mode. If the device is online, this alteration will be written to the device immediately following the users' confirmation. All other variables of this panel may be updated by entering the new desired value into the corresponding field. The device will not recognize these changes unless the Save/Send button of the Limits and Tuning Panel is pressed. The Done button will close the Limits and Tuning Panel, if there were any changes made to this panel the user will be prompted to save before the panel is removed from view.

## **SP Table Panel**

The SP Table Panel will be opened for the user to edit and/or view by pressing the SP Table button on either the offline or the online PID Settings Panel. The SP Table Panel contains a Number of Points variable which will determine how many X and Y fields this SP Table Panel will display. The user may select this number from 2 through 16 by selecting the appropriate value from the Number of Points combo boxes' drop-down list. The user may edit the X and Y values by entering the desired value into the corresponding field. The device will not recognize any changes until the Send/Save button is pressed. The SP Table Panel can be closed by pressing the Done button. If the Done button is pressed and there are changes to the SP Table Panel, the user will be prompted to save these changes before the panel will close. The SP Table Panel is used in conjunction with the SP Time and SP variables of the TT301 PID Settings Panel. When the SP Generator Mode is On and the SP Time Mode is in Run the device will try to correspond the SP Time (X value) and the SP (Y value) variables with the values entered into the table by the user. For example, if the SP Tables' X1 (SP Time) value is .5 and its' Y1 (SP) value is 70, the PID Settings Panel, while the SP Time Mode is in Run, will appropriately, show the SP variable value at 70 when the SP Time variable is at .5 minutes. Although, an offline device will not show this behavior, the SP Table is available on the offline PID Settings Panel in order to save a configuration for later use with an online device.

## **PID Graphics Panel**

When the PID Graphics button of the PID Settings Panel is pressed and the TT301 device is online, the PID Graphics Panel will appear on the screen. This panel can not be opened if the PID Mode of the PID Settings Panel is Off. This panel contains a main section, where the graph panel is located, a button section, which is located to the right of the graph panel, and an edit values section, which is located at the bottom of the panel below the main section.

The main section of this PID Graphics panel is where the actual graphing will be displayed. This section contains the value measurement along the Y-axis of the graph, the time measurement along the X-axis of the graph, and variables to manipulate these X and Y values below the graphing display area. The Graph Time (measured in minutes) may be altered by either selecting

a value from the drop-down list, the available options are 1 through 10, or by typing in the new desired value as long as this value is a positive whole number.

When the Edit Graph Values button, located in the main section of the PID Graphics panel, is pressed the Edit Graph Values dialog will open on the screen. This panel will allow the user to change the Interval Time (in seconds) of the graph by either selecting an option from the drop-down list or typing in the desired value, this value must be a positive whole number. The interval time is the time span, in seconds, that the graph will wait before updating the display. The Min and Max Value variables may also be edited in the same way, either by selecting a value from the appropriate drop-down list or manually typing in the new desired value, again this must be a whole number but negative numbers are allowed. The Min Value will be displayed as the lowest point of the Y-axis and the Max Value will be displayed as the highest point of the Y-axis. These variables may be updated at any time during or after a graphing session but may not be altered during. The graphing session is started by pressing the Start Graphing button located in the main section of the PID Graphics panel and may be stopped before the graph time has expired by pressing the Stop button.

The edit values section of the PID Graphics panel contains the SP, the PV, the MV, the KP, the TR, the TD, the PID and the SP Tracking variable buttons. These variable buttons will display the current value of the variable held by the device and when pressed will allow the user to edit this variable at any point during or before a graphing session. The SP button will display the set point value from the TT301 device in yellow to correspond to the set point value displayed in the graph panel of this panel. When this button is pressed by the user, the Edit Set Point Value dialog will open where the user may change the value and send this new value directly to the online device.

If the SP Tracking variable is On, the set point value is read only, and the user will be informed that this variable is no longer editable if they try to change it. The PV button will display the process variable value from the TT301 device in green to correspond to the process variable value displayed in the graph portion of this panel. This variable is not editable by the user, when this button is pressed the user will be informed that this variable is read only.

The MV button will display the manipulated variable value from the TT301 device in blue to correspond to the manipulated variable value displayed in the graph of this panel. When this button is pressed by the user, the Edit Manipulated Value dialog will open where the user may edit the variable and send this new value directly to the online device. If the PID Mode is set to "Auto", the manipulated variable value becomes read only, and the user will be informed that this variable is no longer editable if they try to change it.

The KP, TR, and TD buttons will display the corresponding variable value from the TT301 device in black, these variables are not displayed in the graph of this panel, only updated on the button face. When these buttons are pressed by the user, the appropriate Edit Value dialog, similar to the ones for the SP and MV variables, will open where the user may edit the variable and send this new value directly to the online device.

The PID Mode button will display the current PID Mode value of the TT301 device. When this button is pressed by the user, the Change PID Mode dialog will open where the user may choose to change from "Auto" to "Manual", or from "Manual" to "Auto", whichever the case may be. If the SP Tracking mode is currently On when the PID Mode is set to "Manual", the SP Tracking mode will automatically be turned Off.

The SP Tracking button will display the current SP Tracking mode value of the online TT301 device. When the user presses this button, the Change SP Tracking dialog will open where the user may choose to change from "On" to "Off", or vice-versa. If the PID Mode value is set to "Auto" when the user presses the SP Tracking button, they will be informed that this action is not possible.

After or during a graph session, the user may choose to view the list of variable values that have accrued during the graphing process. This may be accomplished by pressing the View Trending button located in the right portion of the TT301 PID Graphics panel. The dialog that is opened shows the logged values of the SP, PV, and MV variables preceding the date and time of that graph reading. This log may be printed to your local printer, saved as a new text file, or exported to a .csv file by selecting the desired option from the File menu contained in this dialog.

To return to the TT301 PID Settings Panel, press the Done button.

## **Maintenance Panel**

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Device Reset, the Loop Test, the Operations Counter, or the Passwords Panel.

### **Device Reset**

Please refer to the Generic Maintenance Panel located in the Generic Device Frame section for more information on the Device Reset operation.

### **Loop Test**

Please refer to the Generic Maintenance Panel description located in the Generic Device Frame section for more information regarding the Loop Test procedure.

### **Operations Counter**

Pressing the Operations Counter button on the Maintenance Panel opens the Operations Counter Panel. The Operations Counter Panel is a read only panel, the variables contained in this panel may only be viewed by the user. This panel displays the number of times a particular operation has been executed, this value will be displayed to the right of the operations' name.

The TT301 Operations Counter Panels' operations include the number of times the fixed current trim command has been edited, the current trim command has been executed with 4, and with 20 mA, the zero trim command has been executed, the trim variables have been read from the device, the sensor mode has been changed, the burnout variable has been edited, the operations counter command has been executed, the Multidrop command has been executed, the password level has been changed, and the write protect mode has been edited.

The Done button should be pressed by the user to remove the Operations Counter panel from the screen and return to the Maintenance Panel.

## **Passwords**

Pressing the Passwords button on the Maintenance Panel opens the Password Level Panel. The Password Level Panel consists of a number of combo boxes, each containing the values 0 through 3, and a Change Password button. Each combo box represents a different panel found in the TT301 Device Frame and its' current password level.

The TT301 Password Level Panel contains the current password level of the Information Panel, the Configuration Panel, the PID Settings Panel, the Trim Panel, the Maintenance Panel and the Alarm Panel, as well as the password level needed to download to an online TT301 device. The user may change these levels by selecting the desired value from the associated combo box and pressing the Send button.

To close the Password Level Panel and return to the Maintenance Panel the user simply needs to press the Done button.

The user may change the actual password of each password level by pressing the Change Passwords button of the Password Level Panel. After pressing this button the Password Panel will open. The Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online device by pressing the Send button. To close the Password Panel and return to the Password Level Panel, press the Done button.

## **Trim Panel**

*Online Only*

The Trim Panel provides the user access to the Current, the Zero, the Gain, and the Factory Trim functions.

### **Current Trim**

Pressing the Current Trim button of the Trim Panel will open the Current Trim Panel where the user may update the current trim data. For more information on this procedure, please refer to the Generic Trim Panel's Current Trim description located in the Generic Device Frame section.

## **Zero Trim**

Pressing the Zero Trim button on the Trim Panel opens the Zero Trim window and performs a Zero Trim operation on the online device. Please refer to the Generic Trim Panel's Zero Trim description in the Generic Device Frame section for more information about this procedure.

## **Gain Trim**

The user may perform a Gain Trim operation on the device by pressing the Gain Trim button located on the Trim Panel; the user will be prompted to apply the gain input. When the user selects OK, the Gain Trim Panel will open. The Gain Trim Panel consists of the Value variable, which is the devices' current transmitter variables value, this variable is monitored and updated accordingly. The New Value field is where the user can enter their new desired value. The user should press the Send button to execute the Gain Trim operation on the device. Pressing the Done button will close the Gain Trim Panel and abort the operation if the user has not previously pressed the Send button.

## **Factory Trim**

If the user presses the Factory Trim button of the Trim Panel, the Factory Trim command will be sent to the device after the user confirms their decision to execute this operation.

### **TT411/TT421 Device Information**

## **Smar TT411/TT421 Device Frame**

If the SmarConf™ HART Configurator finds a Smar TT411/TT421 Device located on your HART Network, the application will display this device with its specific variables in an appropriate TT411 or TT421 Device Frame.

An Offline TT411/TT421 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar TT411 or TT421 device type.

## **TT411/TT421 Device Panels**

Device Panels that are contained within a Smar TT411/TT421 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),

- the Range Panel,
- the Configuration Panel,
- the Sensor Panel,
- the Alarm Panel,
- the PID Settings Panel,
- the Maintenance Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- >- the Notes Panel (offline only).

## **Configuration Panel**

The Configuration Panel is contained in both the offline and the online TT411/TT421 Device Frame. The offline Configuration Panel variables include the Burnout Mode (Burnout), which may be toggled between High and Low, and the Function variable which is read only and may not be edited by the user. The online Configuration Panel contains the Burnout Mode and the Function variables, which behave similarly whether online or offline, and the Write Protect variable which is read only and will display “Read / Write” if the device may be written to and “Read Only” if the devices’ write protect is set to enabled. Any changes made to the online Configuration Panel are sent immediately to the device upon confirmation from the user.

## **Sensor Panel**

The Sensor Panel is contained in both the offline and the online TT411/TT421 Device Frame, both panels behave similarly and contain the same variables. The Sensor Panel variables include the Current Sensor, which is a Read Only variable. The Measuring Type, Sensor Type, the Sensor, and the Connection, can be updated by selecting a new value from the corresponding combo boxes’ drop-down list. The Type combo box list will always stay the same but the Sensor and Connection combo box lists correspond directly to the Type value. On the Sensor Panel, the drop-down lists are not the only variables that change according to the Type of Sensor, there are six variables which are not shown unless the Type is a specific one. One of these dynamic variables is the Cold Junction Mode, this variable is added to the panel when the Type contains the value TC, mV, or Special. The Cold Junction may be toggled between Enabled or Disabled. If the Type value is Special, the Configure Special Sensor button will be added to the panel. When the Configure Special Sensor, button is visible on the screen, the Connection

variable will be removed from the screen. If the user presses this button, the Special Sensor Panel will open. When the Type value is Call. Van Dusen, the text field variables R0, CVDA, CVDB, and CVDC will be added to the panel. When these variables are added to the screen, the Sensor variable will be removed from the screen. If the user selects the “Average” value from the Measuring Type field, the Average Limit variable will appear on the screen, the user may edit this value by simply entering the new desired value into the text field.

## Special Sensor Panel

The Special Sensor Panel is opened when the Configure Special Sensor button is pressed on the Sensor Panel. The Special Sensor Panel variables include the Range, the Connection, the Table button, the Sensor Unit, the Unit Family, the Unit, the Upper Range Limit, the Lower Range Limit, and the Minimum Span. The user may alter the URL, LRL and Minimum Span simply by typing in the desired value into the corresponding field. The Sensor Unit field is read only but this variable may be changed by first selecting the type from the Unit Family combo box list, and then selecting the Unit from the Unit combo box list. The Unit field, as well as the URL, LRL and Minimum Span unit labels, will be automatically updated. The Special Sensor Unit field behaves very much like the Unit field of the Range Panel. The Range and Connection variables of the Special Sensor Panel may be updated by selecting the new desired value from the appropriate combo box drop-down list. The Special Sensor Panel can be closed by pressing the Done button. The user will be prompted to save their changes if the Done button is pressed and the changes have not been sent or saved to the TT411/TT421, this operation may be completed by pressing the Send/Save button.

## Special Sensor Table Panel

If the user presses the Table button contained in the Special Sensor Panel, the Special Sensor Table Panel will open for the user to view and/or edit. The Special Sensor Table Panel contains the same variables whether the device is offline or online. The Special Sensor Table Panel contains the Number of Points which may contain the value 2 through 16, this value may be selected from the drop-down list. The Number of Points variable directly reflects on the number of X and Y table points shown on the panel. The X and Y table point fields may be updated by selecting the text in the desired field and entering the new desired value. The X table points may contain values from -6400 through 6400, but they must be entered consistently in either ascending or descending order. The Y table points may contain values from -0.625 through 106.25, these values do not need to be entered in any particular format. The edited values may be stored to a file by pressing the Save button, for an offline device, or sent directly to the online device by pressing the Send button. The Special Sensor Table Panel will close when the Done button is pressed.

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Device Reset, the Loop Test, the Diagnosis, the Operations Counter, or the Passwords Panel.

### **Device Reset**

Please refer to the Generic Maintenance Panel located in the Generic Device Frame section for more information on the Device Reset operation.

### **Loop Test**

Please refer to the Generic Maintenance Panel description located in the Generic Device Frame section for more information regarding the Loop Test procedure.

### **Diagnosis Panel**

Pressing the Diagnosis button on the Maintenance Panel opens the Diagnosis panel. The Diagnosis panel contains the Maximum PV and Minimum PV variables which are Read Only, and the Reset Values button, which if pressed will reset the Maximum and Minimum PV values of the TT411/TT421 device. The Done button will close the Diagnosis Panel and return to the Maintenance Panel.

### **Operations Counter**

Pressing the Operations Counter button on the Maintenance Panel opens the Operations Counter panel. The Operations Counter panel is a Read Only panel, the variables contained in this panel may only be viewed by the user. This panel displays the number of times a particular operation has been executed, this value will be displayed to the right of the operations' name. The TT411/TT421 Operations Counter Panels' operations include the number of times the: zero trim command has been executed, fixed current trim command has been executed, current trim command has been executed with 4, and with 20 mA, trim variables have been read from the device, burnout variable has been edited, sensor mode has been changed, pid mode variable has been changed, measuring type variable has been edited, reset diagnostics command has been executed, and Multidrop command has been executed. The Done button should be pressed by the user to remove the Operations Counter panel from the screen and return to the Maintenance Panel.

### **Passwords**

Pressing the Passwords button on the Maintenance Panel opens the Password Level panel. The Password LevelPanel consists of a number of combo boxes, each containing the values 0 through 3, and a Change Password button. Each combo box represents a different panel found in the TT411/TT421 Device Frame and its' current password level. The TT411/TT421 Password Level Panel contains the current password level of the Information Panel, the Configuration Panel, the PID Settings Panel, the Trim Panel, the Maintenance Panel and the Alarm Panel. The user may change these levels by selecting the desired value from the associated combo box and pressing

the Send button. To close the Password Level Panel and return to the Maintenance Panel the user simply needs to press the Done button. The user may change the actual password of each password level by pressing the Change Passwords button of the Password Level Panel. After pressing this button the Password Panel will appear. The Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online device by pressing the Send button. To close the Password Panel and return to the Password Level Panel, press the Done button.

## **FY301 Device Information**

### **Smar FY301 Device Frame**

If the SmarConf™ HART Configurator finds a Smar FY301 Device located on your HART Network, the application will display this device with its specific variables in a FY301 Device Frame.

An offline FY301 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar FY301 device type.

### **FY301 Device Panels**

Device Panels that are contained within a Smar FY301 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),
- the Configuration Panel,
- the Table Panel,
- the Advanced Configuration Panel,
- the Setup Panel,
- the Diagnostic Panel,

- the Maintenance Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

Information Panel

Device Information Panel

Monitor Panel

Specific Monitor Panel

Device Status Panel

## Configuration Panel

The Configuration Panel is contained in both the offline and the online FY301 Device Frames. The offline Configuration Panel variables include the Alarm Selection, which may be toggled between Open, Close and Last Value, the Function variable which may be updated by selecting the new value from the drop-down option list, and the LCD Indication, which may be toggled between PV and SP. The available options for the function drop-down list include Linear, Eq Per\_50, Q Open\_50, Table, Eq Per\_25, Q Open\_25, Eq Per\_33, and Q Open\_33.

The online Configuration Panel contains the Alarm Selection and the Function variable, which behave similarly whether online or offline, and the Write Protect variable which is read only and may not be edited by the user.

Table Panel

## Advanced Configuration Panel

The Advanced Configuration Panel is contained in both the offline and online FY301 Device Frames. The offline and online Advanced Configuration Panels include the Valve Type, the Air To Action, and the Valve Action variables. Each of these variables may be updated by selecting the desired push button; the Valve Types' value may contain either Linear or Rotary, the Air To value may contain either Open or Close, and the Valve Action may contain Direct or Reverse.

The rest of the Advanced Configuration Panel variables may be updated by entering the desired value into the corresponding field. These additional variables displayed on the panel include the Split Range Lo Limit, the Split Range High Limit, the Set Point Low Limit, the Set Point High

Limit, the Power Up Input, the Tight Shut Off DeadBand, the Tight Shut Off, the DevDeadBand, and the DevTime. The DevDeadBand variable value must be between 0 and 100, and the DevTime variable value must be between 0 and 60.

Any changes made to the Valve Type, Air To, or Valve Action variables will be sent directly to the FY301 device, if online, if offline, the Save button must be pressed. The variables containing text fields rather than push buttons for their values must be sent to the device by pressing the Send button for an online device or the Save button to store the changes if the device is offline.

## **Setup Panel**

The Setup Panel is contained in both the offline and online FY301 Device Frames. The Setup Panel variables include the buttons to execute the Auto Setup operation, the Lower Position operation, and the Upper Position operation, although these are disabled if the FY301 device is offline. The panel also includes the Time to close, Time to open, the Servo KP, and the Servo TR variables. These variables may be edited by typing in the new desired numeric value into the corresponding field. The Time to close and Time to open variables must contain values between 0 and 60, the Servo KP variable must contain values between 1 and 45, and the Servo TR variable must contain values between 0 and 999. The Setup Panel of an online device includes a Status button, this button is used in conjunction with the Auto and Position Setup operations.

## **Auto Setup**

Pressing the Auto Setup button will start the Auto Setup operation, the user will first be warned that this process takes a few minutes and that they should ensure their valve is offline. At this point, the user can decide to discontinue this operation by selecting the No button or continuing by selecting the Yes button. If the user decides to continue, the Auto Setup Progress Panel will appear on the screen, this dialog will keep the user informed of how far along they are in the process until it is complete.

The Status Panel, if opened during this process by pressing the Status button, will inform the user that it is in the auto setup process by checking the appropriate list item. Once the Auto Setup is complete, the Status Panel will open automatically to show the user any error or warning messages received from the FY301 device during the setup process. The Status panel may be opened at any time by pressing the Status button on the Setup Panel.

## **Lower Position**

If the Lower Position button is pressed, the Lower Position Setup procedure will begin, the user will be warned that the valve should be offline and given the opportunity to cancel the operation. If the user decides to continue by selecting the Yes button, the Lower Position Panel will appear on the screen. The user may enter the desired value into the Value field and press Send, this value must be a numeric value between -10% and 10% of the lower valve position. This will execute the lower valve position command to the FY301 device. The user should press the Done button after they send the command or if they decide to close the Lower Position Panel.

## Upper Position

The Upper Position procedure works in the same manner as the Lower Position, to start the operation the user should first press the Upper Position button of the Setup Panel, the user is first warned to make sure the valve is offline. The Upper Position Panel is displayed on the screen if the user chose to continue by pressing the Yes button on the previous dialog. Like the Lower Position procedure, the user should enter the desired value into the Value field and press the Send button to execute the command, the new value must be a numeric value between 90% and 110% of the upper valve position. The Done button may be pressed to close the Upper Position Panel.

## Diagnostic Panel

The Diagnostic Panel is contained in both the offline and online FY301 Device Frames. The Diagnostic Panel variables include the DeadBand, the Travel Range, the Max Mileage, the Engineering Unit, the Reversal DeadBand, and the Reversal Limit. The Engineering Unit may be updated by selecting the desired value, either mm or %, from the drop-down option list. Once recognized by the device, this change to the engineering unit will force the Travel Range and Max Mileage variable unit labels to be updated to correspond with this new value. The rest of the Diagnostic Panel variables may be altered by simply entering the updated value into the appropriate field and pressing the Send, if online, or the Save, if offline, button. The DeadBand and Reversal DeadBand variables must contain numeric values between 0 and 100.

The online Diagnostic Panel contains a few variables that the offline panel does not. These variables include the Diagnostics Enabled and Disabled checkboxes, the Diagnosis button, and the Positioner Status button. The Diagnostics may be Enabled or Disabled by checking the appropriate checkbox. If the Diagnostics Enabled checkbox is selected, the Diagnosis button will become enabled as well. In the same respect, if the Diagnostics Disabled checkbox is selected, the Diagnosis button will become disabled. Although the Diagnostics Disabled and Diagnostic Enabled variables are actually contained in the offline Diagnostic Panel they will not enable or disable the Diagnosis button since it does not appear on the offline panel.

## Diagnosis Panel

If the user presses the Diagnosis button on the Diagnostic Panel while it is enabled, the Diagnosis Panel will open. From this panel, the user may reset one or all of the listed registers. The value of each of the registers is displayed for the user to view. The user has the option to reset either the Mileage, the Strokes, the Reversals, the Highest Temperature, the Lowest Temperature, or Reset All Registers. To execute this operation, the user should check the appropriate registers checkbox and press the Send button. The user may close the Diagnosis Panel at any time by pressing the Done button.

## Positioner Status Panel

If the user would like to check the status of the Positioner, they may do so by selecting the Positioner Status button of the Diagnostic Panel. The Positioner Status Panel will open where the user can inspect the list of possible complications. The list item will be checked and the color of the message will be turned to blue if this error is received from the online FY301 device. Once the Positioner Status Panel is open, the device will be monitored on its status until the panel is closed.

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from opening the Local / Remote Panel, the Additional Information Panel, performing the Device Reset operation, opening the Operations Counter Panel, the Password Panel, performing a Read from Transducer, a Write to Transducer, or opening the Performance Panel.

## Local / Remote Panel

Pressing the Local / Remote button on the Maintenance Panel will cause the Local / Remote Panel to open. This panel allows the user to set the valve position to a new desired value. If the Operating Mode of the online FY301 device is set to Remote the SP Value field will be read only, not editable by the user. If the value needs to be changed rather than just analyzed the user should select the Enable Local Mode checkbox. This action will force the FY301 device into Local Mode, as with most device altering commands, the SmarConf™ HART Configurator will need the user to confirm their decision before the command is actually sent to the device. If the Yes button is pressed from this dialog, the SP Value field will become editable and the user may enter the desired value into the field. The process is not complete until the user presses the Send button. To close the Local / Remote Panel, press the Done button. If the FY301 device is still in Local Mode, the user will be prompted to change it back to Remote Mode. If the No button from this dialog is chosen, the Local / Remote Panel will remain on the screen until the user disables the Enable Local Mode checkbox and again presses the Done button.

## Additional Information Panel

The Additional Information Panel will appear on the screen if this button is pressed on the Maintenance Panel. The Additional Information Panel includes the actuator and valve information variables, which may be edited by the user by entering the new desired value into the appropriate field. Once the new value is entered into the field, press the Send button, and the device will acknowledge these changes. The Additional Information Panel can be closed by pressing the Done button.

## **Device Reset**

Please refer to the Generic Maintenance Panel located in the Generic Device Frame section for more information on the Device Reset operation.

## **Operations Counter**

Pressing the Operations Counter button on the Maintenance Panel opens the Operations Counter Panel. The Operations Counter Panel is a read only panel, the variables contained in this panel may only be viewed by the user. This panel displays the number of times a particular operation has been executed, this value will be displayed to the right of the operations' name.

## **Passwords**

Pressing the Passwords button on the Maintenance Panel opens the Password Level Panel. The Password Level Panel consists of a number of combo boxes, each containing the values 0 through 3, and a Change Password button. Each combo box represents a different panel found in the FY301 Device Frame and its' current password level.

The Password Level Panel contains the current password level of the Information Panel, the Configuration Panel, the Monitor Panel, the Maintenance Panel and the Advanced Configuration Panel. The user may change these levels by selecting the new desired value from the associated combo box and pressing the Send button.

To close the Password Level Panel and return to the Maintenance Panel the user simply needs to press the Done button.

The user may change the actual password of each password level by pressing the Change Passwords button of the Password Level Panel. After pressing this button the Password Panel will appear. The Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online device by pressing the Send button. To close the Password Panel and return to the Password Level Panel, press the Done button.

## **Read From Transducer**

Pressing the Read from Transducer button on the Maintenance Panel first opens a Transfer Data confirmation dialog. Select Yes to proceed with the operation, or No to return to the Maintenance Panel.

## **Write To Transducer**

Pressing the Write to Transducer button on the Maintenance Panel first opens a Transfer Data confirmation dialog. Select Yes to proceed with the operation, or No to return to the Maintenance Panel.

## **Performance Panel**

Pressing the Performance button on the Maintenance Panel will cause the Performance Panel to open. From this panel, the user may view the values of the time opening and the time closing variables of this online FY301 device, these variables are read only and can not be edited by the user. This panel also allows the user to run a performance test on the device, this operation is executed by pressing the Performance Test button of this Performance Panel. Once the user confirms their decision to perform this operation, the device will inform the user of the tests' progress with a dialog that informs them that the test is still running. This dialog will disappear when the test is complete.

To close the Performance Panel, press the Done button.

## **Trim Panel**

*Online Only*

The Trim Panel provides the user access to the Current, and the Temperature Trim functions of this online FY301 device.

### **Current Trim**

Pressing the Current Trim button of the Trim Panel will open the Current Trim Panel where the user may update the current trim data. For more information on this procedure, please refer to the Generic Trim Panel's Current Trim description located in the Generic Device Frame section.

### **Temperature Trim**

Pressing the Temperature Trim button on the Trim Panel opens the Temperature Trim Panel. The Temperature Trim Panel consists of two variables, the Value and the New Value; the Value is the current temperature of the online device which is monitored and updated accordingly, the New Value is where the user should enter the desired temperature value. The user may press the Send button in order to execute the Temperature Trim operation or the Done button which will close the Temperature Trim Panel.

## **TP301 Device Information**

## **Smar TP301 Device Frame**

If the SmarConf™ HART Configurator finds a Smar TP301 Device located on your HART Network, the application will display this device with its specific variables in a TP301 Device Frame.

An offline TP301 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar TP301 device type.

## TP301 Device Panels

Device Panels that are contained within a Smar TP301 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),
- the Configuration Panel,
- the User Unit Panel,
- the Maintenance Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## Configuration Panel

The Configuration Panel is contained in both the offline and the online TP301 Device Frame. The offline Configuration Panel variables include the Alarm Selection, which may be toggled between Low and High, the Function, which may be toggled between Linear and Table, the LCD Indication, which may be updated by the user by selecting the desired value from the drop-down option list, and the Action variable which may be toggled between Direct and Reverse. The online Configuration Panel contains the Alarm Selection, the Function, the LCD Indication and the Action variables, which behave similarly whether online or offline. An online TP301 device also contains the Lower Position and the Upper Position Setup buttons, these buttons are disabled on the offline TP301 Device Frame. If the TP301 device is version 1.09 or later, the Damping variable is also available. This variable is displayed on both the online and offline device and can be updated by the user by changing the value in the text field. These changes will

not be recognized by the device until the Send/Save button is pressed. Note: By default, an offline TP301 device will be set to version 1.09.

### **Lower Position Setup**

The user may perform a Lower Position setup operation on the TP301 device by pressing the Lower Position button located on the Configuration Panel. When the user selects this button, the Lower Position Panel will open. The Lower Position Panel consists of the Value variable, which is the devices' current PV value, this variable is monitored and updated accordingly. The user should press the Send button when the value has reached the desired value to execute the Lower Position operation on the device. Pressing the Done button will close the Lower Position Panel.

### **Upper Position Setup**

The user may perform a Upper Position setup operation on the TP301 device by pressing the Upper Position button located on the Configuration Panel. When the user selects this button, the Upper Position Panel will open. The Upper Position Panel, like the Lower Position Panel, consists of the Value variable, which is the devices' current PV value, this variable is monitored and updated accordingly. The user should press the Send button when the value has reached the desired value to execute the Upper Position operation on the device. Pressing the Done button will close the Upper Position Panel.

### **User Unit Panel**

The User Unit Panel contains the same variables whether the TP301 device is offline or online. The User Unit Panel contains the User Unit Mode variable which can be turned On or Off by selecting the corresponding push button. When changing the User Unit Mode, you will be prompted to confirm your change before it is sent to the online device or stored to file.

The PV variable field is not editable by the user but if the device is online, the PV variable will be monitored and displayed. If the device is offline this field will hold the value "n/a" since this variable is not applicable when the device is offline.

The User Unit value can be updated by first selecting the Unit Family value desired by choosing from the drop-down list, if the value selected is "Special", there is no need to pick a Unit value since the User Unit text field will become editable and you may type the desired text into the field. If another Unit Family selection is made, the user may then select the desired Unit value from the drop-down list and this new User Unit value will be displayed in the Unit field as well as the E.U.(0%) and E.U.(100%) unit codes. If the User Unit Mode is On and the device is online, this new User Unit value will also be displayed as the PV unit code.

The E.U. (0%) or lower user unit value and E.U.(100%) or upper user unit value are editable by the user as long as the value entered is a valid numeric value.

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Device Reset, the Loop Test, the Operations Counter, or the Passwords Panel.

### Device Reset

Refer to the Generic Maintenance Panel located in the Generic Device Frame section for more information on the Device Reset operation.

### Loop Test

Refer to the Generic Maintenance Panel description located in the Generic Device Frame section for more information regarding the Loop Test procedure.

### Operations Counter

Pressing the Operations Counter button on the Maintenance Panel opens the Operations Counter Panel. The Operations Counter panel is a read only panel, the variables contained in this panel may only be viewed by the user. This panel displays the number of times a particular operation has been executed, this value will be displayed to the right of the operations' name.

The TP301 Operations Counter Panels' operations include the number of times the function variable has been edited, the upper position and lower position commands have been executed, the action variable has been edited, the current trim command has been executed with 4, and with 20 mA, the password value has been edited, the password level has been changed, the write protect variable has been edited, the equipment data variable has been altered, and the factory defaults restored.

ed by the user to remove the Operations Counter Panel from the screen and return to the Maintenance Panel.

### Passwords

Pressing the Passwords button on the Maintenance Panel opens the Password Level Panel. The Password Level Panel consists of a number of combo boxes, each containing the values 0 through 3, and a Change Password button. Each combo box represents a different panel found in the TP301 Device Frame and its' current password level. The TP301 Password Level Panel contains the current password level of the Configuration Panel, and the Maintenance Panel. The user may change these levels by selecting the desired value from the associated combo box and pressing the Send button.

To close the Password Level Panel and return to the Maintenance Panel the user simply needs to press the Done button.

The user may change the actual password of each password level by pressing the Change Passwords button of the Password Level Panel. After pressing this button the Password Panel will open. The Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online device by pressing the Send button. To close the Password Panel and return to the Password Level Panel, press the Done button.

## **Trim Panel**

*Online Only*

The Trim Panel provides the user access to the Current Trim and the Temperature Trim functions.

### **Current Trim**

Pressing the Current Trim button of the Trim Panel will open the Current Trim window where the user may update the current trim data. For more information on this procedure, please refer to the Generic Trim Panel's Current Trim description located in the Generic Device Frame section.

### **Temperature Trim**

Pressing the Temperature Trim button on the Trim Panel opens the Temperature Trim Panel. The Temperature Trim Panel consists of two variables, the Value and the New Value; the Value is the current temperature of the online device which is monitored and updated accordingly, the New Value is where the user should enter the desired temperature value. The user may press the Send button in order to execute the Temperature Trim operation or the Done button which will close the Temperature Trim Panel.

## **DT301 Device Information**

### **Smar DT301 Device Frame**

If the SmarConf™ HART Configurator finds a Smar DT301 device located on your HART Network, the application will display this device with its specific variables in a DT301 Device Frame.

An offline DT301 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar DT301 device type.

## DT301 Device Panels

Device Panels that are contained within a Smar DT301 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),
- the Configuration Panel,
- the Range Panel,
- the Table Panel,
- the LCD Indicator Panel,
- the Sensor Info Panel,
- the Maintenance Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## Configuration Panel

The Configuration Panel contains the same variables whether the DT301 device is offline or online except for the Write Protect variable which is only available for an online device. The Write Protect variable may be toggled between Enabled and Disabled by pressing the desired push button. The Fail Safe variable contained in the Configuration Panel may also be updated by selecting the desired push button, these values may be toggled between Low or High. The Measurement variable may be altered by selecting the new desired value from the drop-down option list and the Damping value may be edited by typing in the new desired valid numeric

value into the text field. The Activate variable has three push button options, None, Table, or Polynomial and the Temperature Unit variable may be toggled between Celsius and Fahrenheit.

When a variable is edited by push button selections, and the DT301 device is online, the new values will be sent directly to the device upon confirmation from the user. The Damping and Measurement value changes must be sent to the online device by pressing the Send button. All variable changes of an offline device will only be acknowledged if the Save button is pressed.

If the DT301 device version is 2.02 or higher, a new variable is added to the Configuration Panel, the Normal Work Position, which may be toggled between Up and Down.

If the DT301 device version is 2.03 or higher, another new variable is added to the Configuration Panel, the Concentration Table button, which when pressed opens the Concentration Table Panel.

## **Polynomial Values Panel**

The Polynomial Values Panel can be opened enabling the user to view and/or edit the polynomial values of the DT301 device by pressing the Polynomial Values button located on the Configuration Panel. The variables contained on the Polynomial Values Panel do not differ if the DT301 device is offline or online, they both contain the polynomial values one through five, listed as As 0 through As 5, and the upper and lower polynomial limit values. All variables on this panel may be updated by typing the new desired valid numeric value into the corresponding text field.

## **Concentration Table Panel**

The Concentration Table Panel can be opened enabling the user to view and/or edit the concentration table values of the DT301 device, version 2.03 or later, by pressing the Concentration Table button located on the Configuration Panel. The variables contained on the Concentration Table Panel do not differ if the DT301 device is offline or online, they both contain the variables KD, KT, UT, LT, UD, LD, and values 0 through 17. These variables may be updated by the user by simply entering the new desired numeric value into the text field and pressing the Send/Save button. The Done button will close the Concentration Table Panel and return the user to the Configuration Panel.

## **Range Panel**

When the DT301 device held in the Device Frame is online, the Range Panel will contain the PV value, the 4 mA value, the 20 mA value, and the Unit value which is the value contained in the Measurement variable of the Configuration Panel. The Unit value is displayed as the unit code value for each of these variables contained in this panel.

If the DT301 device held in this Device Frame is offline, the Range Panel will display the same variables as the online with the exception of the unit code value of these variables, this will be displayed as "n/a" or not applicable. The user may edit these values by typing the new desired value into its corresponding text field with the exception of the PV value, which is read only.

## **Sensor Information Panel**

The Sensor Info Panel is available for both the offline and online DT301 device. The Sensor Info Panel includes the Flange Type, Probe Material, O-Ring Material, Installation Type, Probe Type, Probe Fluid, Diaphragm Material, Electrical Connection, and the Range variables. The user may update each of these variables by selecting the new desired value from the appropriate combo boxes' drop-down list. The device will recognize the new values when the Send button is pressed, if the device is online, or the Save button is pressed, if the device is offline.

## **Maintenance Panel**

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Device Reset, the Loop Test, the Operations Counter, the Passwords, the Write to Transducer, or the Read from Transducer operations.

### **Device Reset**

Please refer to the Generic Maintenance Panel located in the Generic Device Frame section for more information on the Device Reset operation.

### **Loop Test**

Please refer to the Generic Maintenance Panel description located in the Generic Device Frame section for more information regarding the Loop Test procedure.

### **Operations Counter**

Pressing the Operations Counter button on the Maintenance Panel opens the Operations Counter Panel. The Operations Counter Panel is a read only panel. The user may only view the variables contained in this panel. This panel displays the number of times a particular operation has been executed, this value will be displayed to the right of the operations' name.

The DT301 Operations Counter Panels' operations include the number of times the damping value has been changed, the function value has been changed, the current trim command has been executed with 4, and with 20 mA, the lower or upper trim commands have been executed,

the temperature trim command has been executed, the fail safe value has been edited, the backup command has been executed, the write protect variable has been changed, the concentration trim

command has been executed, the Multidrop command has been executed, and the password level has been changed.

The Done button should be pressed by the user to remove the Operations Counter Panel from the screen and return to the Maintenance Panel.

## **Passwords**

Pressing the Passwords button on the Maintenance Panel opens the Password Level Panel. The Password Level Panel consists of a number of combo boxes, each containing the values 0 through 3, and a Change Password button. Each combo box represents a different panel found in the Device Frame and its' current password level.

The DT301 Password Level Panel contains the current password level of the Configuration Panel, the Trim Panel, and the Maintenance Panel. The user may change these levels by selecting the new desired value from the associated combo box and pressing the Send button.

To close the Password Level Panel and return to the Maintenance Panel the user simply needs to press the Done button.

The user may change the actual password of each password level by pressing the Change Passwords button of the Password Level Panel. After pressing this button the Password Panel will open. The Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online device by pressing the Send button. To close the Password Panel and return to the Password Level Panel, press the Done button.

## **Write To Transducer**

Pressing the Write to Transducer button on the Maintenance Panel first opens a Transfer Data confirmation window. Select Yes to proceed with the operation, or No to return to the Maintenance Panel.

## **Read From Transducer**

Pressing the Read from Transducer button on the Maintenance Panel first opens a Transfer Data confirmation window. Select Yes to proceed with the operation, or No to return to the Maintenance Panel.

## **Trim Panel**

*Online Only*

The Trim Panel provides the user access to the Current, the Temperature, the Self Calibration, the Lower Concentration, the Upper Concentration, the Lower Pressure and the Upper Pressure

Trim functions. This Trim Panel also contains the variable Constant g1 which may be updated by the user by entering the new desired valid numeric value into its text field.

### **Current Trim**

Pressing the Current Trim button of the Trim Panel will open the Current Trim window where the user may update the current trim data. For more information on this procedure, please refer to the Generic Trim Panel's Current Trim description located in the Generic Device Frame section.

### **Temperature Trim**

Pressing the Temperature Trim button on the Trim Panel opens the Temperature Trim Panel. The Temperature Trim Panel consists of two variables, the Value and the New Value; the Value is the current temperature of the online device which is monitored and updated accordingly, the New Value is where the user should enter the desired temperature value. The user may press the Send button in order to execute the Temperature Trim operation or the Done button which will close the Temperature Trim Panel.

### **Self-Calibration Trim**

Pressing the Self Calibration button on the Trim Panel opens the Self Calibration Panel. The Self Calibration Panel prompts the user to select the self calibration operation they would like to execute, the user may choose either the Air button, the Water button, or the Done button which will terminate this operation and return the user to the Trim Panel.

If the user selects the Air button and the Measurement variable is not set to the value kg/m<sup>3</sup>, the user will be informed that this is the configuration the device must have in order to proceed with an Air self-calibration procedure, similarly, if the user selects the Water button and the device is not configured to BRIX, the user will be instructed to change the configuration of the device and then try the Water self-calibration procedure again.

If the user selects the Air button and the DT301 device is configured to Kg/m<sup>3</sup>, or if the user selects the Water button and the device is configured to BRIX, the self-calibration command will be sent to the online device, once complete the Self Calibration Trim dialog will open asking the user if the error value computed is acceptable. If this error value is okay, press the Yes button and the self-calibration operation is complete. If this error value is not okay, press the No button and the self-calibration command will again be sent to the device. This procedure will continue until the user accepts the error value.

### **Lower Concentration Trim**

Pressing the Lower Concentration Trim button on the Trim Panel opens the Lower Concentration Trim Panel. The Lower Concentration Trim Panel consists of two variables, the Value and the New Value; the Value is the current primary variable of the online device which is monitored and updated accordingly, the New Value is where the user should enter the new desired value.

The user may press the Send button in order to execute the Lower Concentration Trim operation or the Done button which will close the Lower Concentration Trim Panel.

### **Upper Concentration Trim**

Pressing the Upper Concentration Trim button on the Trim Panel opens the Upper Concentration Trim Panel. The Upper Concentration Trim Panel consists of two variables, the Value and the New Value; the Value is the current primary variable of the online device which is monitored and updated accordingly, the New Value is where the user should enter the new desired value. The user may press the Send button in order to execute the Upper Concentration Trim operation or the Done button which will close the Upper Concentration Trim Panel.

### **Lower Pressure Trim**

Pressing the Lower Pressure Trim button on the Trim Panel opens the Lower Pressure Trim Panel. The Lower Pressure Trim Panel consists of two variables, the Value and the New Value; the Value is the current PV of the online device which is monitored and updated accordingly, the New Value is where the user should enter the new desired value. The user may press the Send button in order to execute the Lower Pressure Trim operation or the Done button which will close the Lower Pressure Trim Panel.

### **Upper Pressure Trim**

Pressing the Upper Pressure Trim button on the Trim Panel opens the Upper Pressure Trim Panel. The Upper Pressure Trim Panel consists of two variables, the Value and the New Value; the Value is the current PV of the online device which is monitored and updated accordingly, the New Value is where the user should enter the new desired value. The user may press the Send button in order to execute the Upper Pressure Trim operation or the Done button which will close the Upper Pressure Trim Panel.

### **HCC301 Device Information**

## **Smar HCC301 Device Frame**

If the SmarConf™ HART Configurator finds a Smar HCC301 device located on your HART Network, the application will display this device with its specific variables in a HCC301 Device Frame.

An offline HCC301 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar HCC301 device type.

## **HCC301 Device Panels**

Device Panels that are contained within a Smar HCC301 Device Frame include:

- the Information Panel,

- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Device Status Panel (online only),
- the Range Panel,
- the Configuration Panel,
- the Passwords Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## **Range Panel**

The Range Panel of an online HCC301 device differs from the generic Range Panel due to a decrease in the variables this panel displays, please refer to the Generic Range Panel description contained in the Generic Device Frame section for more specifics on these variables. The online and offline Range Panel contains the upper and lower range value variables, the PV Unit, the Unit Family, and the Unit variables only.

## **Configuration Panel**

The Configuration Panel contains the same variables whether the HCC301 device is offline or online with the exception of the Write Protect variable which is only included in the online device. The Write Protect variable may be toggled between Enabled and Disabled, similar to the Alarm Selection, which may be toggled between Low and High. The Variable value may be updated by the user by selecting the desired value from the drop-down list, if the value chosen is Other, the Index Variable will appear on the panel, any other value in this field will leave the Index Variable invisible. The user may update the Index Variable and Number of Retrys variables by typing the new valid numeric value into the corresponding text field. Selecting the new desired value from the drop-down option list can update the Address value. The edited values may be stored to a file by pressing the Save button, for an offline device, or sent directly to the online device by pressing the Send button.

## Passwords Panel

*Online Only*

The Passwords Panel is only available for online HCC301 Device Frames. The Passwords Panel consists of three combo boxes, each drop-down list containing the values 0 through 3, and a Change Password button. Each combo box represents a different panel found in the HCC301 Device Frame and its' current password level. These panels include the Configuration Panel, the Trim Panel, and this panel. The user may change these levels by selecting the new desired value from the associated combo box and pressing the Send button.

The user may change the actual password of each password level by pressing the Change Passwords button. After pressing this button the Change Password Panel will open. The Change Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online HCC301 device by pressing the Send button. To close the Change Password Panel, press the Done button.

## Trim Panel

*Online Only*

The Trim Panel provides the user access to the Current Trim function.

### Current Trim

Pressing the Current Trim button of the Trim Panel will open the Current Trim window where the user may update the current trim data. For more information on this procedure, please refer to the Generic Trim Panel's Current Trim description located in the Generic Device Frame section.

## RD400 Device Information

### Smar RD400 Device Frame

If the SmarConf™ HART Configurator finds a Smar RD400 device located on your HART Network, the application will display this device with its specific variables in a RD400 Device Frame.

An offline RD400 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Smar RD400 device type.

## **RD400 Device Panels**

Device Panels that are contained within a Smar RD400 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Specific Monitor Panel (online only),
- the Device Status Panel (online only),
- the Range Panel,
- the Tank Configuration Panel,
- the Volume Configuration Panel,
- the Unit Codes Panel,
- the Variable Mapping Panel,
- the LCD Indicator Panel,
- the Maintenance Panel (online only),
- the Trim Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## **Tank Configuration Panel**

The Tank Configuration Panel is contained in both the offline and the online RD400 Device Frame, both panels behave similarly and contain the same variables. The Tank Configuration Panel variables include the Probe Type which can be updated by selecting a new value from the combo boxes' drop-down list. The Distance unit is a Read Only variable on this panel while the Reference Height, the Sensor Offset, the Probe Length, the Probe Angle, the Lower Blocking Distance, and the Upper Blocking Distance can all be edited by typing the desired value into the text field and selecting the Save or Send Button to store the new value to the device. The

diagram on the right hand portion of the panel is for reference to the various variables of the tank configuration.

## **Volume Configuration Panel**

The Volume Configuration Panel is contained in both the offline and the online RD400 Device Frame, both panels behave similarly and contain the same variables. The display and variables contained within the Volume Configuration Panel depend on the value of the Tank type variable which may be edited by selecting the desired value from the drop-down menu of this variables combo box. If the Tank type value is “None”, the Tank height and Tank diameter may be edited by simply entering the desired value into the appropriate text field. If the Tank type value is “Sphere”, the Tank diameter may be edited by entering the desired value into the text field; a diagram corresponding to this variable will be shown on the right hand side of the panel as well. The Tank type value “Horizontal Cylinder”, “Horizontal Bullet”, “Vertical Cylinder”, and “Horizontal Bullet” all have the variables Tank Height and Tank Diameter but differ by the diagram displayed at the right hand side of the panel. When the Tank type value is “Table”, the variables Tank Height and Tank Diameter are still available but there is no diagram displayed; instead a “Table” button will be shown. If the user presses the “Table” button, the “Volume Table” dialog will appear. The Volume Table includes the Number of Table Entries variable which may be edited by selecting the options 2 through 10 from the drop-down menu. The user may also edit the values for the Level and Volume of each Table Entry simply by entering the desired value into the appropriate text field and then sending these values to the device. The variables Level Unit and Volume Unit are displayed for reference only on the Volume Table dialog. The Volume Table dialog is removed from view when the Done button is pressed.

## **Unit Codes Panel**

The Unit Codes Panel is contained in both the offline and the online RD400 Device Frame, both panels behave similarly and contain the same variables. The Unit Codes Panel variables include the Distance unit, the Volume unit, and the Temperature unit values which can all be updated by selecting a new value from the combo boxes’ drop-down lists.

## **Variable Mapping Panel**

The Variable Mapping Panel is contained in both the offline and the online RD400 Device Frame, both panels behave similarly and contain the same variables. The Variable Mapping Panel variables include the Primary Variable, the Secondary Variable, the Tertiary Variable, and the Quaternary Variable code values which can be updated by selecting a new value from the combo boxes’ drop-down list. The user must press either the Save or Send button in order to store changed values to the device.

## LCD Indicator Panel

The LCD Indicator Panel is available for both the offline and online device. The LCD Indicator Panel includes the Display 1st and Display 2nd variables. The user may update each of these variables by selecting the new desired value from the appropriate combo boxes' drop-down list. The new values will be recognized by the device when the Send button is pressed when the device is online, or the Save button is pressed when the device is offline.

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Device Reset, the Loop Test, the Line Voltage, the Derivate Voltage, or the Change Passwords Panel. From this panel, the user may also view and/or edit the Alarm Selection, the Write Protect, and the Sensor Threshold Level variables. The Alarm Selection and Write Protect variables will automatically be sent to the device upon their selection but the Sensor Threshold Level will not be sent to the device until the user chooses to press the Send button.

### Device Reset

Refer to the generic Maintenance Panel located in the generic section of this manual for more information on the Device Reset operation.

### Loop Test

Refer to the generic Maintenance Panel description located in the generic portion of this manual for more information regarding the Loop Test procedure.

## Line Voltage Panel

When the Line Voltage button on the Maintenance Panel is pressed, the user will be prompted to select which measurement they would like the graph to be displayed in, either the Distance or the Digital Units. If the Distance Units is selected, the x axis of the graph will be measured with the distance unit currently held by the device, for example 0-10 meters, while if Digital Values are selected, the x axis of the graph will be the number of points to be used, for example 0-1024. The Line Voltage Panel will appear almost identical whichever value selected, the difference will be in the x axis display values and the Settings panel which will appear when the user selects the Settings button. The other buttons that appear on the Line Voltage Panel include Start, which starts the graphing procedure; Stop, which stops the graphing procedure; Open, which opens a previously stored graph configuration; Save, which stores the current graph configuration to file; Print, which prints the current graph configuration to your local printer; and the Auto Save Log check box which if selected, will automatically log this graphing session to file. For more

information about any of these procedures, please refer to the Graphic Panel description contained in this appendix.

## **Derivative Voltage Panel**

The Derivative Voltage Panel and the Line Voltage Panel differ only in the calculation of the values being measured.

## **Change Passwords Panel**

The user may change the actual password of each password level by pressing the Change Passwords button of the Maintenance Panel. After pressing this button the Password Panel will appear. The Password Panel consists of three push buttons, each representing a password protection level, and a text field where the user may enter a new password value. After the user has selected the password level and typed in the new value they may register this new password with the online device by pressing the Send button. To close the Password Panel and return to the Maintenance Panel, press the Done button. This operation is considered an administrative task and requires the highest level password in order to execute.

## **Trim Panel**

*Online Only*

The Trim Panel provides the user access to the Current, the Temperature, the Distance, and the Restore Factory Trim functions.

### **Current Trim**

Pressing the Current Trim button of the Trim Panel will open the Current Trim window where the current trim data may be updated by the user. For more information on this procedure, please refer to the generic Trim Panel's Current Trim description located in the main section of this manual.

### **Temperature Trim**

Pressing the Temperature Trim button on the Trim Panel opens the Temperature Trim window. The Temperature Trim Panel consists of two variables, the Value and the New Value; the Value is the current temperature of the online device which is monitored and updated accordingly, the New Value is where the user should enter the desired temperature value. The user may press the Send button in order to execute the Temperature Trim operation or the Done button which will close the Temperature Trim Panel.

### **Distance Trim**

Pressing the Distance Trim button on the Trim Panel opens the Distance Trim window. The Distance Trim Panel consists of two variables, the Value and the New Value; the Value is the current distance of the online device which is monitored and updated accordingly, the New Value text field is where the user should enter the desired distance value. The user may press the Send button in order to execute the operation or the Done button which will close the Distance Trim Panel.

### **Factory Restore Trim**

Trim command will be sent to the device after the user confirms their decision to execute this operation.

## **Solartron Mobrey MLT100 Device Information**

### **Mobrey MLT100 Device Frame**

If the SmarConf™ HART Configurator finds a Mobrey MLT100 Device located on your HART Network, the application will display this device with its specific variables in a MLT100 Device Frame.

An Offline MLT100 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Mobrey MLT100 device type.

### **MLT100 Device Panels**

Device Panels that are contained within a Mobrey MLT100 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Panel (online only),
- the Device Status Panel (online only),
- the Diagnostic Panel (online only),
- the Calibrate Information Panel,
- the Engineering Panel,

- the Protected Panel,
- the Displacer Panel,
- the LVDT Configuration Panel,
- the Range Panel,
- the Maintenance Panel (online only),
- the Sensor Rerange Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## **Information Panel**

### **Device Information Panel**

### **Monitor Panel**

### **Device Status Panel**

### **Diagnostic Panel**

#### *Online Only*

The Diagnostic Panel is available for online MLT100 devices only, all variables contained on this panel are read only and are constantly monitored to ensure the values are displayed in real time. The Diagnostic Panel includes the Normalized sensor output (D21) which has the constant unit value of mV, the Compensated sensor output (D22), the Raw sensor output (D23), the Percentage Range (D24) which has the constant unit value of percentage, and the Temperature reading (D25) which has the constant unit value of degrees Celsius. The Temperature reading

value is either the value preset in the Electronics temperature (P44) variable of this device, or the value derived from the sensor on the PCB in the enclosure.

## Calibrate Information Panel

The Calibrate Information Panel contains the same variables whether the MLT100 device is online or offline. The Curve profile variable may be edited by the user by selecting the new desired value from the drop-down list, these values include Linear, Special, Horizontal Cylinder, Spherical, Conical 1 (50% of height), Conical 2 (25% of height), Flume/Weir (3/2), or V-Notch (5/2). These values directly correspond to the ten curve profile point values located at the bottom portion of the Calibrate Information Panel. The Curve Point values (P30 through P39) will be set and read only for the user for any curve profile value except for "Special". If "Special" is chosen from the Curve Profile combo box, the curve point text fields will automatically become editable for the user and will accept values between 0.0 and 100.0. The Calibrate Information Panel also contains the PV scale factor variable which may be updated by the user by entering the new desired value into the text field, this value must be greater than 0. If the curve profile is Linear, this variable represents the multiplier for the PV in units per metre, otherwise this variable represents the maximum PV value for the curve profile selected. This panel also contains the variables Standing level / volume (P14) which represents the value of the PV at the zero level point, this offset is added after all the other calculations, this variable may be updated by the user by entering the desired value into the text field. The level for the maximum PV (P17) variable, which represents the height of the displacer for the maximum PV value, may be updated by the user by entering the new value into the text field, if the value 0 is entered, this variable will be set to Automatic, and if so the Displacer length (P51) variable will be used as the maximum PV value. The level for the minimum PV (P18), which represents the height of the displacer for the minimum PV value, may be updated by the user by entering the new desired float value into this text field. The MLT100 device will not recognize the changes made by the user until the Save/Send button is pressed.

## Engineering Panel

The Engineering Panel contains the same variables whether the device is offline or online. The Engineering Panel contains the Alarm delay (P21), the Alarm action (P22), the Display 1(P23), the Display 2(P24), the Process Temperature (P25), the SG Upper (P26), and the SG Lower (P27) variables which may be edited by the user whether the device is online or offline. The Alarm delay, which defines the time delay in seconds between the occurrence of a fault condition and the current output going to the value specified in the alarm action, the user may edit this field as long as the value they enter is between 0 and 1,000. The Alarm action (P22), which defines the current output when a fault condition exists, may be updated by selecting the desired value from the drop-down menu, valid values for this variable are Minimum, Hold, or Maximum. The Display 1 (P23) variable, which selects the source of the value displayed as the main display may be updated to contain any of the following values, the Process Variable, Level, Current Output, Percent, Ullage, Normalized Sensor Output, Compensated Sensor Output, Raw Sensor Output, Percent Range, or Temperature Reading, by selecting the new desired value from the drop-down menu list. The Display 2 (P24) variable, which selects the source of the value to be displayed as

an alternate to that of Display 1, can be updated to contain any of the values listed for Display 1, as well as the value None, by selecting the new value from the drop-down menu. The Process Temperature (P25) defines the temperature inside the vessel being measured, if this value is set to Automatic by entering 0, then the temperature measured by the sensor in the instrument head is used. The constant unit value for this variable is degrees Celsius, the user may update this variable with any value between -100 and 400.0. The SG Lower (P26) variable, which represents the specific gravity of the lower liquid in the system, can be updated by the user with any numeric value between 0 and 10. The SG Upper (P27) variable, which represents the specific gravity of the upper liquid in the system, may also contain the values 0 through 10. Changes to the device will be recognized after the Send/Save button is pressed and the new values are sent or saved to the MLT100 device.

## Protected Panel

The Protected Panel contains the same variables whether the device is offline or online. The Protected Panel contains the Temperature (P44), the Temperature coefficient (P45), the Temperature maximum (P46), and the Temperature minimum (P47). The Temperature (P44) represents the electronics temperature of the device, which if set to a value, then the temperature will be fixed, else if set to NaN, by entering 0, the integral temperature sensor will be used. The temperature is used to correct for system temperature effects. This variable will always display the constant unit value of degrees Celsius and may be updated by the user with numeric values between -40 and 85.0. The Temperature coefficient (P45) variable represents the correction factor for temperature effects of the system and may be edited by the user by entering new valid numeric values into the text field. The Temperature maximum (P46) which represents the maximum temperature to which the head end of the instrument has been subjected to, will display the constant unit value of degrees Celsius and will contain the value "n/a" if the MLT100 device is offline. The Temperature minimum (P47) which represents the minimum temperature to which the head end of the instrument has been subjected to, will display the constant unit value of degrees Celsius and will contain the value "n/a" if the MLT100 device is offline. The device will recognize new values for the device after the Send/Save button has been pressed by the user.

## Displacer Panel

The Displacer Panel contains the same variables whether the device is offline or online, these variables include the Displacer length (P51), the Displacer area (P52), the Displacer weight (P53), the Spring material (P54), the Spring rate (P55), the Temperature setup (P58), and the SG setup (P59). The Displacer length (P51) represents the effective length of the displacer, its constant unit value is meters and the user may update this text field with any numeric value above 0.1. The Displacer area (P52) represents the displacer cross section area which is the cross sectional area of the displacer, this variable will display the constant unit value of square centimeters and may be updated by the user with any numeric value above -0.01. The Displacer weight (P53) represents the total weight of the displacer and the attached rod/actuator assembly, the constant unit value will be displayed as grams and the minimum value the user may enter into this text field is 10.0. The Spring material (P54) may be updated by selecting the new

desired value from the drop-down menu list, the valid values for this variable are Stainless Steel 316, Co Cr Ni, Inconel, Monel, or Special. The Spring rate (P55) represents the load versus extension rate of the spring, the constant unit value will be displayed as grams per centimeter and the minimum value the user may enter into this text field is 10.0. The Temperature setup (P58) represents the process temperature assumed to apply that was used for the initial calibration, the constant unit value will be displayed as degrees Celsius and the user may enter any numeric value between -100 and 400.0 into this text field. The SG setup (P59) represents the specific gravity of the upper fluid that was assumed during calibration, this text field may contain any numeric value between 0 and 10.0. The device will recognize changes made by the user after the Send/Save button has been pressed.

## LVDT Configuration Panel

The LVDT Configuration Panel contains the same variables whether the device is offline or online, these variables include the LVDT gain (P66), the LVDT rate (P67), the Upper limit (P68), the Lower limit (P69), the Minimum sensor out (P60), the LVDT coefficient 1 (P61), the LVDT coefficient 2 (P62), the LVDT coefficient 3 (P63), the LVDT coefficient 4 (P64), and the LVDT coefficient 5 (P65). The LVDT gain (P66), represents the gain factor for the calibration of the sensor assembly, this variable may contain any numeric value between 0 and 2.0. The LVDT rate (P67) represents the rate for calibration of the sensor assembly, this variable will display the constant unit value of milliVolts per centimeter, the user may edit this text field with any numeric value between 100 and 1,000.0. The Upper limit (P68) variable represents the level sensors upper limit, the maximum usable sensor output, this variables constant unit value is displayed as milliVolts. The Lower limit (P69) variable represents the level sensors lower limit value, the minimum usable sensor output, this variables constant unit value is displayed as milliVolts. The LVDT Minimum sensor out (P60) variable represents the base sensor value, it sets the value of D20 for the minimum level. This variable displays the constant unit value of milliVolts and can be updated by the user with numeric values between -2,000 and 2,000.0. This LVDT coefficient 1 through 5 (P61 through P65) represent the value used to linearize the LVDT, these variables may contain the numeric values -2.0 though 2.0.

Range Panel

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Additional Status, the Device Reset, the Loop Test, the Current Trim, the Password Status, or the Transmitter Type operations.

### Additional Status

Pressing the Additional Status button on the Maintenance Panel opens the Additional Status panel. The Additional Status panel is a Read Only panel. The user may only view the variables

contained in this panel. This panel displays the additional status of this online MLT100 device, the parameters that are monitored by this panel include the Output Fault Low status, the Output Fault High status, the RAM Test Failure status, the EEPROM Checksum Error status, the EEPROM Signature Error status, the ADC Reference Low status, the ROM Checksum Error status and the ADC Reference High status. If any of these status variables are flagged on the device, the checkbox text will be displayed as red and the check box will be checked.

### **Device Reset**

Refer to the generic Maintenance Panel located in the main section of this manual for more information on the Device Reset operation.

### **Loop Test**

Refer to the generic Maintenance Panel description located in the main portion of this manual for more information regarding the Loop Test procedure.

### **Current Trim**

Pressing the Current Trim button of the Maintenance Panel will open the Current Trim window where the user may update the current trim data. For more information on this procedure, please refer to the generic Trim Panel's Current Trim description located in the main section of this manual.

### **Password Status**

Pressing the Passwords Status button on the Maintenance Panel opens the Password Status panel. The Password Status Panel consists of the current password status field and the Edit Password Status button. The Current Password Status field will show the user the current value of the password status, this field may contain the values Closed, OPENx, or OPEN. The passwords are 62 to program the parameters that are normally accessible to the user, and 962 to program the protected parameters as well. If any other value is entered then the password is closed. OPEN is displayed if the password is at 62 and OPENx if it is at 962.

To change the password of this MLT100Device, the user can press the Edit Password Status button on the Password Status panel, this will open the Edit Password dialogue. Once the new desired password value has been entered into the text field the OK button should be pressed to send these changes to the device, the Cancel button should be pressed to cancel this operation and return to the Edit Password Panel.

### **Transmitter Type**

Pressing the Transmitter Type button on the Maintenance Panel opens the Transmitter Type panel. The Transmitter Type Panel displays the current transmitter type variable, which may be updated by the user by entering the new value into the text field. The user may send these

changes to the MLT100 device by pressing the Send button or close the Transmitter Type Panel by pressing the Done button.

## Sensor Rerange Panel

*Online Only*

The Sensor Rerange Panel is only available for online MLT100 devices and provides the user the option to change the maximum or minimum level of the sensor.

### Maximum Level

Pressing the Maximum Level button on the Sensor Rerange Panel will first open a prompt instructing the user to apply the upper range input and wait a few seconds, once the user has done so they can press the OK button to open the Maximum Level Panel or the Cancel button to terminate this operation.

Once the Maximum Level Panel is opened the user may monitor the sensor value displayed in the text field, when this reaches the new desired value, the user should press the Send button to send these changes to the device. The user may press the Done button at any time to cancel the operation and return to the Sensor Rerange Panel.

### Minimum Level

Pressing the Minimum Level button on the Sensor Rerange Panel will first open a prompt instructing the user to apply the lower range input and wait a few seconds, once the user has done so they can press the OK button to open the Minimum Level Panel or the Cancel button to terminate this operation.

Once the Minimum Level Panel is opened, the user may monitor the sensor value displayed in the text field, when this reaches the new desired value, the user should press the Send button to send these changes to the device. The user may press the Done button at any time to cancel the operation and return to the Sensor Rerange Panel.

### Solartron Mobrey MSP100 Device Information

## Mobrey MSP100 Device Frame

If the SmarConf™ HART Configurator finds a Mobrey MSP100 Device located on your HART Network, the application will display this device with its specific variables in a MSP100 Device Frame.

An Offline MSP100 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Mobrey MSP100 device type.

## MSP100 Device Panels

Device Panels that are contained within a Mobrey MSP100 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Readings Panel (online only),
- the Device Status Panel (online only),
- the Diagnostic Panel (online only),
- the Calibrate Information Panel,
- the Engineering Panel,
- the Protected Panel,
- the Range Panel,
- the Maintenance Panel (online only),
- the Ref Pin Echo Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

### Diagnostic Panel

#### *Online Only*

The Diagnostic Panel is available for online MSP100 devices only, all variables contained on this panel are read only and are constantly monitored to ensure the values are displayed in real time. The Diagnostic Panel includes the Target range (D910) which has the constant unit value of meters and represents the distance from the sensor face or the customer's flange to the surface returning the echo, the Echo size (D911) which has the constant unit value of percentage and represents the strength of the returned echo, if this value is greater than 100% the echo is saturated, the Success rate (D912) which also has the constant unit value of percentage and represents the measure of the reliability of the returned echo, the Number of echoes (D913) represents the number of echoes returned from each transmit pulse, this value can be a maximum

of 3 , the Speed of Sound (D914) which has the constant unit value of meters per second and represents the speed of sound calculated from the Speed of sound variable (P24) located on the Engineering Panel of this Device Frame and the temperature, or from the reference pin if fitted, the Temperature reading (D915) which has the constant unit value of degrees Celsius and represents either the value preset in the Temperature variable (P25) located on the Engineering Panel of this Device Frame, or the value derived from the sensor in the transducer, and finally, the Frequency (D916) which has the constant unit value of kHz and represents the frequency of the pulse train in each transmit burst.

## Calibrate Information Panel

The Calibrate Information Panel contains the same variables whether the MSP100 device is online or offline. The Curve profile (P11) variable may be edited by the user by selecting the new desired value from the drop-down list, these values include Linear, Special, Horizontal Cylinder, Spherical, Conical 1 (50% of height), Conical 2 (25% of height), Flume/Weir (3/2), or V-Notch (5/2). These values directly correspond to the ten curve profile point values located at the bottom portion of the Calibrate Information Panel. The Curve Point values (P30 through P39) will be set and read only for the user for any curve profile value except for "Special". If "Special" is chosen from the Curve Profile combo box, the curve point text fields will automatically become editable for the user and will accept values between 0.0 and 100.0. The Calibrate Information Panel also contains the Bottom reference variable (P10) which has the constant unit value of meters and may be updated by the user by entering the new desired value into the text field as long as the value entered is at least 0, this variable represents the distance from the sensor to the zero point from which the level is to be calculated, the PV scale factor variable (P13) may also be updated by the user by entering the new desired value into the text field as long as this value is at least 0. If the curve profile is Linear, the PV scale factor variable represents the multiplier for the PV in units per meter, otherwise this variable represents the maximum PV value for the curve profile selected. This panel also contains the variable Profile height (P14) which has the constant unit value of meters and if the curve profile value is not linear will represent the level for the maximum value for the PV, this value may also be updated by entering a minimum value of 0 into its text field. The Alarm high (P17) represents the percentage value of the PV above which the PV out of limits status bit will be set and the Alarm low (P18) represents the percentage value of the PV below which the PV out of limits status bit will be set, both of these variables may be edited by the user by typing a valid numeric value into the corresponding text field. The MSP100 device will not recognize the changes made by the user until the Save/Send button is pressed.

## Engineering Panel

The Engineering Panel contains the same variables whether the device is offline or online. The Engineering Panel contains the Lost echo delay (P21), the Lost echo action (P22), the Blanking distance (P23), the Speed of sound (P24), the Temperature (P25), the Threshold (P26), the Ref pin distance (P27), the Ref pin threshold (P28) and the Target select (P29) variables which may be edited by the user whether the device is online or offline. The Lost echo delay (P21), represents the delay after which a continuous lost echo is reported, and the action specified by

the Lost echo action is taken, the user may edit this field as long as the numeric value they enter into its text field is between 1 and 250, this variables constant unit value is seconds. The Lost echo action (P22), which represents the value to which the PV and current will be set if the echo is lost for the time set by the Lost echo delay variable, may be updated by selecting the desired value from the drop-down menu, valid values for this variable are Minimum, Hold, Maximum, or Alarm. The Blanking distance (P23), represents the target blanking distance of this device which is the distance from the sensor up to which all echoes will be ignored, this value may be updated by entering a new numeric value between 0 and 9,999 into the text field, the constant unit value for this variable is meters. The Speed of sound (P24), which represents the nominal speed of sound for the ullage space at 0 ° C, has a constant unit value of meters per second, this text field will allow the user to enter numeric values between 150 and 2,000.0. The Temperature (P25) variable, if set to a value, will be fixed, else if set to Automatic by entering 0, the integral temperature sensor will be used as this variables value. The temperature value is used for speed of sound calculations, unless the reference pin option is "Fitted", the user may enter numeric values between -40 and 120.0 into this text field, this variables constant unit value is degrees Celsius. The Threshold (P26) variable represents the target threshold level of the MSP100 device, which if set to Automatic by entering 0, will be proportional to the echo size. If this value is fixed, it sets the minimum valid echo size, the user may update this value by entering a new numeric value between 0 and 57.0 into its text field, the constant unit value is percentage. The Ref pin distance (P27) variable represents the reference pin distance of this device, which is the distance from the flange to the pin in millimeters, the user may enter the value 0 for no pin present, which will be displayed as Automatic, or any other numeric value between 200 and 9900.0. The Ref pin threshold (P28) variable represents the reference pin threshold, which if set to Automatic, is proportional to the echo size, if this value is fixed, it sets the minimum value echo size. The constant unit value for this variable is percentage, the user may edit this value with any numeric value between 0 and 57, if 0 is entered the value will be set to Automatic. The Target select (P29) variable represents the target selection variable of this device and can be updated by the user by selecting the new desired value from the drop-down list, "Both" is the normal setting, "Target" ignores the reference pin, and "Pin" only measures the reference pin distance. Changes to the device will be recognized after the Send/Save button is pressed allowing the new values to be sent or saved to this MSP100 device.

## Protected Panel

The Protected Panel contains the same variables whether the device is offline or online. The Protected Panel contains the Pulse rate (P41), the Echoes needed (P42), the Threshold 1 time (P43), the Number of pulses (P44), the Frequency (P45), the Temperature max (P46), the Temperature min (P47), the Ref pin pulses (P50), the Ref pin frequency (P51), and the Ref pin blanking (P52). The Pulse rate (P41) represents the pulse repetition rate of this MSP100 device which defines the interval between two ultrasonic pulses and may be changed to avoid cross talk between two adjacent transmitters, the user may update this variable by choosing Standard, 1.05 s, or 1.10 s from the drop-down list of this combo box. The Echoes needed (P42) variable of this panel represents the number of echoes which must be returned from the same target before this is considered to be a valid target, the value is typically 4 echoes, but the user may edit this value by entering a numeric value between 1 and 30 into this text field. The Threshold 1 time (P43) represents the target threshold 1 time variable of this device, this value defines the time that the

threshold is kept at maximum so as to avoid ringing, the value is typically 2 milliseconds but the user may enter any numeric value between 1 and 99.0 into this text field, the constant unit value is milliseconds. The Number of pulses (P44) sets the number of cycles in the ultrasonic burst, the typical value is 10 cycles, the user may enter any numeric value between 4 and 64 into this text field. The Frequency (P45) represents the target frequency value of this device and is normally on Automatic so that the best frequency for the application can be found, this value can be fixed, but not all integer values are available, the user may select Automatic, 30 through 34, 37, 38, 40, 42, 44, 46, 49, 51, 54, 58, 61, 66, or 71 kHz from the drop-down list of this combo box. The Temperature max (P46) and the Temperature min (P47) have a constant unit value of degrees Celsius and represents the maximum and minimum temperature to which the transducer of this MSP100 device has been subjected, the user may update this variable by entering the new desired value into the corresponding text field. The Ref pin pulses (P50) variable represents the reference pin pulses of this device which defines the number of pulses in the ultrasonic burst used to measure the reference pin. If this value is set to Automatic, it will adjust the number of pulses to keep the echo size within certain limits, the user may select 4 through 30 pulses or Automatic from the drop-down list of this combo box. The Ref pin frequency (P51) variable is normally on Automatic so that the best frequency for the application can be found, this value can be fixed, but not all integer values are available, the user may select Automatic, 30 through 34, 37, 38, 40, 42, 44, 46, 49, 51, 54, 58, 61, 66, or 71 kHz from the drop-down list of this combo box. The Ref pin blanking (P52) variable has a constant unit value of milliseconds and represents the time of flight, up to which all echoes, when looking at the reference pin will be ignored, the user may update this text field with any numeric value between 0.1 and 99. The MSP100 device will recognize the new values after the Send/Save button has been pressed by the user.

## **Maintenance Panel**

### *Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Additional Status, the Device Reset, the Loop Test, the Current Trim, or the Password Status operations. The MSP100 Maintenance Panel also displays the Sensor material (D09) variable for the user, this variable is read only and represents the material used for the wet side face of the transducer of this device.

### **Additional Status**

Pressing the Additional Status button on the Maintenance Panel opens the Additional Status panel. The Additional Status panel is a Read Only panel, the variables contained in this panel may only be viewed by the user not edited. This panel displays the additional status of this online MSP100 device, the user may choose to view the first status bit from the device or the second status bit. The first status bit parameters monitored by this panel include the Lost Echo On Target status, the Lost Echo On Pin status, the RAM Test Failure status, the EEPROM Checksum Error status, the EEPROM Signature Error status, the Speed of Sound Based on Temperature status, the ROM Checksum Error status, and the Speed of Sound Out of Limits status which may be displayed by pressing the Status 0 button of the Additional Status panel. Pressing the Status 1 button will open the Status 1 Panel which monitors the second status bit of

this device, these parameters include the Fixed On Target status and the Fixed On Pin status. If any of these status variables are flagged on the device, the checkbox text will be displayed as red and the check box will be checked. Pressing the Done button on either the Status 0 or the Status 1 panels will bring the user back to the Additional Status panel and pressing the Done button on the Additional Status panel will bring the user back to the Maintenance Panel of this MSP100 Device Frame.

ice Reset

Refer to the generic Maintenance Panel located in the main section of this manual for more information on the Device Reset operation.

### **Loop Test**

Refer to the generic Maintenance Panel description located in the main portion of this manual for more information regarding the Loop Test procedure.

### **Current Trim**

Pressing the Current Trim button of the Maintenance Panel will open the Current Trim window where the current trim data may be updated by the user. For more information on this procedure, please refer to the generic Trim Panel's Current Trim description located in the main section of this manual.

### **Password Status**

Pressing the Passwords Status button on the Maintenance Panel opens the Password Status panel. The Password Status Panel consists of the current password status field and the Edit Password Status button. The Current Password Status field will show the user the current value of the password status, this field may contain the values Closed, OPENx, or OPEN. The passwords are 62 to program the parameters that are normally accessible to the user, and 962 to program the protected parameters as well. If any other value is entered then the password is closed. OPEN is displayed if the password is at 62 and OPENx if it is at 962.

To change the password of this MSP100Device, the user can press the Edit Password Status button on the Password Status panel, this will open the Edit Password dialogue. Once the new desired password value has been entered into the text field the OK button should be pressed to send these changes to the device, the Cancel button should be pressed to cancel this operation and return to the Edit Password Panel.

### **Ref Pin Echo Panel**

*Online Only*

The Ref Pin Echo Panel is only available for online MSP100 devices and contains read only variables. The variables contained in this panel are monitored continuously and include the Pin

distance (D30) which represents the distance of the reference pin based on the derived speed of sound, the constant unit value is millimeters, the Echo size (D911) represents the strength of the returned echo of this device, a value greater than 100% indicates the echo is saturated, this variables constant unit value is percentage, the Success rate (D32) represents the reference pin success rate and defines the measure of the reliability of the returned echo, expressed as a percentage of this MSP100 device, the Time of flight (D33) variable represents the time taken for the echo to return in milliseconds, the Number of pulses (D34) variable represents the number of cycles in the ultrasonic burst of this device, and the Frequency (D916) represents the reference pin frequency variable of this device which defines the frequency of the pulse train in each transmit burst, this variables constant unit value is kHz.

#### **Solartron Mobrey MSP900/400 Device Information**

### **Mobrey MSP900/400 Device Frame**

If the SmarConf™ HART Configurator finds a Mobrey MSP900/400 Device located on your HART Network, the application will display this device with its specific variables in a MSP900/400 Device Frame.

An Offline MSP900/400 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Mobrey MSP900/400 device type.

### **MSP900/400 Device Panels**

Device Panels that are contained within a Mobrey MSP900/400 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Readings Panel (online only),
- the Device Status Panel (online only),
- the Diagnostic Panel (online only),
- the Calibrate Information Panel,
- the Engineering Panel,
- the Protected Panel,
- the Range Panel,
- the Maintenance Panel (online only),

- the Relay Panel,
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## Diagnostic Panel

### *Online Only*

The Diagnostic Panel is available for online MSP900/400 devices only, all variables contained on this panel are read only and are constantly monitored to ensure the values are displayed in real time. The Diagnostic Panel includes the Target range (D910) which may contain the unit value of metres, feet or inches and represents the distance from the sensor face or the customer's flange to the surface returning the echo, the Echo size (D911) which has the constant unit value of percentage and represents the strength of the returned echo, if this value is greater than 100% the echo is saturated, the Success rate (D912) which also has the constant unit value of percentage and represents the measure of the reliability of the returned echo, the Number of echoes (D913) represents the number of echoes returned from each transmit pulse, this value can be a maximum of 3, the Speed of Sound (D914) which may contain the unit value of metres, feet or inches per second and represents the speed of sound calculated from the Speed of sound variable (P24) located on the Engineering Panel of this Device Frame and the temperature, the Temperature reading (D915) which may contain the unit value of degrees Celsius or Fahrenheit and represents either the value preset in the Temperature variable (P25) located on the Engineering Panel of this Device Frame, or the value derived from the sensor in the transducer, and finally, the Frequency (D916) which has the constant unit value of kHz and represents the frequency of the pulse train in each transmit burst.

## Calibrate Information Panel

The Calibrate Information Panel contains the same variables whether the MSP900/400 device is online or offline. The Curve profile (P11) variable may be edited by the user by selecting the new desired value from the drop-down list, these values include Linear, Special (plotted), Horizontal Cylinder (Flat), Spherical, Horizontal Cylinder (Dome), Flume (3/2), V-Notch (5/2), Manning Formula, Special (calculated), Parshall 1 (1'), Parshall 2 (2'), Parshall 3 (3'), Parshall 4 (4'), Parshall 5 (5'), Parshall 6 (6'), Parshall 8 (8'), Flume Flat 1, Flume Flat 2, Flume Flat 3, Flume Flat 4, Flume Flat 5, Flume Flat I, Flume Flat II, Flume Flat III, Flume Flat III bis, Flume Flat III ter, Flume Flat IV, Flume Flat V, Flume Flat V bis, Flume Flat VI, Flume Flat VII, Flume Flat VIII, Flume Flat VIII bis, Flume Flat IX, Flume Flat IX bis, Flume Flat X, Flume Flat X bis, Flume Flat X ter, Flume Flat XI, Flume Parabolic 1, Flume Parabolic 2, Flume Parabolic 3, Flume Parabolic 4, Flume Parabolic 5, Flume Parabolic 6, or Flume Parabolic 7. These values directly correspond to the ten point curve profile values located at the bottom portion of the Calibrate Information Panel. The Curve Point values (P30 through P39) will be set

and read only for the user for any curve profile value except for "Special (plotted)". If "Special (plotted)" is chosen from the Curve Profile combo box, the curve point text fields will automatically become editable for the user and will accept values between 0.0 and 100.0. The Curve Point values will not be visible to the user unless the Curve profile value is Linear, Special (plotted), Horizontal Cylinder (Flat), Spherical, Horizontal Cylinder (Dome), or Manning Formula. The Calibrate Information Panel also contains the Bottom reference variable (P10) which may contain the unit value of metres, feet or inches and may be updated by the user by entering the new desired value into the text field as long as the value entered is a positive numeric value, this variable represents the distance from the sensor to the zero point from which the level is to be calculated, the PV scale factor variable (P13) may also be updated by the user by entering the new desired value into the text field. The PV scale factor becomes un-editable by the user if the curve profile selected is not Linear, Special (plotted), Horizontal Cylinder (Flat), Spherical, Horizontal Cylinder (Dome), Flume (3/2), V-Notch (5/2), Manning Formula, or Special (calculated). If the curve profile is Linear, the PV scale factor variable represents the multiplier for the PV in units per metre, feet or inches, otherwise this variable represents the maximum PV value for the curve profile selected. This panel also contains the variable Profile height (P14) which may contain the unit value of metres, feet or inches and if the curve profile value is not linear will represent the level for the maximum value for the PV, this value may also be updated when the curve profile selected is Special (plotted), Horizontal Cylinder (Flat), Spherical, Horizontal Cylinder (Dome), Manning Formula, or Special (calculated), by entering a positive numeric value into its text field. The MSP900/400 device will not recognize the changes made by the user until the Save/Send button is pressed.

## Engineering Panel

The Engineering Panel contains the same variables whether the device is offline or online. The Engineering Panel contains the Lost echo delay (P21), the Lost echo action (P22), the Blanking distance (P23), the Speed of sound (P24), the Temperature (P25), and the Threshold (P26) variables which may be edited by the user whether the device is online or offline. The Lost echo delay (P21), represents the delay after which a continuous lost echo is reported, and the action specified by the Lost echo action is taken, the user may edit this field as long as the numeric value they enter into its text field is within the range of 1 and 9,999, this variables constant unit value is seconds. The Lost echo action (P22), which represents the value to which the PV and current will be set if the echo is lost for the time set by the Lost echo delay variable, may be updated by selecting the desired value from the drop-down menu, valid values for this variable are Minimum, Hold, or Maximum. The Blanking distance (P23), represents the target blanking distance of this device which is the distance from the sensor up to which all echoes will be ignored, this value may be updated by entering a new numeric value between 0 and 9,999 into the text field, the unit value for this variable may be either metres, feet or inches. The Speed of sound (P24), which represents the nominal speed of sound for the ullage space at 0 ° C, may contain the unit value of metres, feet or inches per second, this text field will allow the user to enter numeric values. The Temperature (P25) variable, if set to a value, will be fixed, else if set to Automatic by entering 0, the integral temperature sensor will be used as this variables value. The temperature value is used for speed of sound calculations, the user may enter numeric values into this text field, this variables' unit value may contain degrees Celsius or Fahrenheit. The Threshold (P26) variable represents the target threshold level of the MSP900/400 device, which

if set to Automatic by entering 0, will be proportional to the echo size. If this value is fixed, it sets the minimum valid echo size detected, the user may update this value by entering a new numeric value into its text field, the constant unit value is percentage. Changes to the device will be recognized after the Send/Save button is pressed allowing the new values to be sent or saved to this MSP900/400 device.

## Protected Panel

The Protected Panel contains the same variables whether the device is offline or online. The Protected Panel contains the Pulse rate (P41), the Echoes needed (P42), the Threshold 1 time (P43), the Frequency (P45), the Spike rejection (P49), the Temperature max (P46), the Temperature min (P47), the Auto cycle, and the Base units. The Pulse rate (P41) represents the pulse repetition rate of this MSP900/400 device which defines the interval between two ultrasonic pulses and may be changed to avoid cross talk between two adjacent transmitters, the user may update this variable by choosing 0.5 s, 0.6 s, 0.7 s, 0.8 s, 0.9 s, 1.0 s, 1.1 s, 1.2 s, 1.3 s, 1.4 s, 1.5 s, 1.6 s, 1.7 s, 1.8 s, 1.9 s, or 2.0 s from the drop-down list of this combo box. The Echoes needed (P42) variable of this panel represents the number of echoes which must be returned from the same target before this is considered to be a valid target, the value is typically 4 echoes, but the user may edit this value by entering a numeric value between 1 and 30 into this text field. The Frequency (P45) represents the target frequency value of this device and is normally on Automatic so that the best frequency for the application can be found, this value can be fixed, but not all integer values are available, the user may select Automatic, 49, 50, 51, 53, 54, 56, or 58 kHz from the drop-down list of this combo box. The Spike rejection (P49) variable may be changed to Off, 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, or 100 by selecting the desired value from the drop-down list of this combo box. The Temperature max (P46) and the Temperature min (P47) may contain the unit value of degrees Celsius or Fahrenheit and represent the maximum and minimum temperature to which the transducer of this MSP900/400 device has been subjected. The Auto cycle variable may be updated by selecting the new value from the drop-down list of this combo box, these values include Normal Operation, Pause, and Run. The Base units variable may also be updated in the same way, the valid values for the base units value are feet, metres, and inches. The MSP900/400 device will recognize the new values after the Send/Save button has been pressed by the user. The MSP900/400 will then load the factory default values in to the required units and restart the device.

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Additional Status, the Device Reset, the Loop Test, the Current Trim, or the Password Status operations. The MSP900/400 Maintenance Panel also displays the Sensor material (D09) variable for the user, this variable is read only and represents the material used for the wet side face of the transducer of this device.

### Additional Status

Pressing the Additional Status button on the Maintenance Panel opens the Additional Status panel. The Additional Status panel is a Read Only panel, the variables contained in this panel may only be viewed by the user not edited. This panel displays the additional status of this online MSP9/400 device, the user may choose to view the first status byte from the device or the second status byte. The first status byte parameters monitored by this panel include the Lost Echo On Target status, the RAM Test Failure status, the EEPROM Checksum Error status, the EEPROM Signature Error status, the ROM Checksum Error status, and the Speed of Sound Out of Limits status which may be displayed by pressing the Status 0 button of the Additional Status panel. Pressing the Status 1 button will open the Status 1 Panel which monitors the second status byte of this device. If any of these status variables are flagged on the device, the checkbox text will be displayed as red and the check box will be checked. Pressing the Done button on either the Status 0 or the Status 1 panels will bring the user back to the Additional Status panel and pressing the Done button on the Additional Status panel will bring the user back to the Maintenance Panel of this MSP900/400 Device Frame.

### **Device Reset**

Refer to the generic Maintenance Panel located in the main section of this manual for more information on the Device Reset operation.

### **Loop Test**

Refer to the generic Maintenance Panel description located in the main portion of this manual for more information regarding the Loop Test procedure.

### **Current Trim**

Pressing the Current Trim button of the Maintenance Panel will open the Current Trim window where the current trim data may be updated by the user. For more information on this procedure, please refer to the generic Trim Panel's Current Trim description located in the main section of this manual.

### **Password Status**

Pressing the Password Status button on the Maintenance Panel opens the Password Status panel. The Password Status Panel consists of the current password status field and the Edit Password Status button. The Current Password Status field will show the user the current value of the password status, this field may contain the values Closed, OPENx, or OPEN. The passwords are 62 to program the parameters that are normally accessible to the user, and 962 to program the protected parameters as well. If any other value is entered then the password is closed. OPEN is displayed if the password is at 62 and OPENx if it is at 962.

To change the password of this MSP900/400 Device, the user can press the Edit Password Status button on the Password Status panel, this will open the Edit Password dialogue. Once the new desired password value has been entered into the text field the OK button should be pressed to

send these changes to the device, the Cancel button should be pressed to cancel this operation and return to the Edit Password Panel.

## Relay Panel

The Relay Panel is available for both the offline and online MSP900/400 devices and contains read only variables. The variables contained in this panel are monitored continuously (if online) and include the Relay 1 Status and the Relay 2 Status which will always read Off if offline, but may read either Off or On if the device is online. The Relay 1 button may be pressed to open the Relay 1 Panel and the Relay 2 button should be pressed to open the Relay 2 Panel. Both relay panels contain the On Setpoint and the Off Setpoint variables appropriate to its specific relay, which the user may edit by entering the desired numeric value into the corresponding text field. Relay 1 Mode may be updated by the user by selecting the new value from the combo box, either On, Off, or Setpoint, Relay 2 Mode may also be updated by the user by selecting the new value from the combo box, Relay 2 Mode options include On, Off, or Normal Mode. The Save/Send button should be pressed in order for the MSP900/400 device to acknowledge any changes or the Done button may be pressed to return to the Relay Panel.

### Solartron Mobrey MRL800 Device Information

## Mobrey MRL800 Device Frame

If the SmarConf™ HART Configurator finds a Mobrey MRL800 Device located on your HART Network, the application will display this device with its specific variables in a MRL800 Device Frame.

An Offline MRL800 Device Frame may be chosen to work with new devices that will be recognized by the SmarConf™ HART Configurator as a Mobrey MRL800 device type.

## MRL800 Device Panels

Device Panels that are contained within a Mobrey MRL800 Device Frame include:

- the Information Panel,
- the Device Info Panel (online only),
- the Monitor Readings Panel (online only),
- the Device Status Panel (online only),
- the Range Panel,
- the Duty Panel,

- the Engineering Panel,
- the System Panel,
- the Reading Variables Panel (online only),
- the DSP Panel (online only),
- the ESP Panel (online only),
- the History Panel (online only),
- the Maintenance Panel (online only),
- the Graphics Panel (online only),
- the Multidrop Panel (online only), and
- the Notes Panel (offline only).

## **Duty Panel**

The Duty Panel contains the same variables whether the MRL800 device is online or offline. The Duty (D090) variable may be edited by the user by selecting the new desired value from the drop-down list, these values include Dist down from DRP, Dist down from XRP, Level up from MDRP, Level up from TRP, and Level up from GRP. The PV units (P012) variable may also be edited by selecting the new desired value from the drop-down list, these include metre, centimeter, millimeter, feet, and inch. The Max distance measure (P010), the Bottom offset (P017), the Ground offset (P018), and Distance offset (P019) variables contain a unit value that is consistent with the sensor unit variable (L200) and may be edited by changing the value contained in the text field. The PV scaling variable may also be edited by the user by simply changing the value in the text field. The user must press the send button to send these changes to the online device or the save button to save these changes to the offline device.

## **Engineering Panel**

The Engineering Panel consists of a row of buttons that when pressed will open various other panels; the user may choose from the Echo Management Panel, the Tracking Panel, the Tank Map Panel, the Clutter Panel, or the Bottom Tracking Panel. The MRL800 Engineering Panel also displays the Known distance (P099) variable for the user, this variable is editable on both the online and offline device frames, the user simply has to change the value of the text field and press save for an offline device or send for an online device.

## Echo Management Panel

The Echo Management Panel contains the same variables whether the device is offline or online. The Echo Management Panel contains the Top blanking (P023) and Bottom blanking (P024) variables which both contain a unit value consistent with the sensor units value (L200). The Enable echo size (P026) may contain the value On or Off. The Min echo size (P027) and Max echo size (P028) contain a unit value consistent with the echo unit value (P60-15). The Enable amp wt (P041) and Max number of echoes (P043) variables do not contain a unit value. The Enable echo width (P043) may contain the values On or Off. The Echo Management Panel also displays the variables Min echo width (P044) and Max echo width (P045). The Enable echo SNR (P046) variable may contain the values On or Off. The Min echo SNR (P046) and Max echo SNR (P048) variables contain a unit value consistent with the echo unit value (P60-15). The Echo algorithm (P040) variable may contain the values Biggest Nearest, Biggest in Search, Nearest in Search, or Furthest. All of the MRL800 Echo Management variables are editable by the user but will not be recognized by the device until the Save/Send button is pressed.

## Tracking Panel

The Tracking Panel also contains the same variables whether the device is online or offline. The Enable track win (P049) variable which may contain the values On or Off, and the Track win height (P050) variable which has a unit value consistent with the sensor unit value (L200) are displayed on the Tracking Panel. The Max bin shift (P054) variable also has a unit value consistent with the sensor unit value (L200). The Track win hits (P051) and Track win misses (P052) variables are also displayed on the Tracking Panel but do not have a unit value associated with them. The Win growth rate (P053) variable has a constant unit value of %, the LE delay time (P021) variable has a constant unit value of seconds, the Alarm current (P055) variable has a constant unit value of mA, and the Noise threshold multiplier (P606) has a constant unit value of dB. The LE alarm action (P022) variable is also displayed on the Tracking Panel and may contain the values Drive high to 22 mA, Drive low to 3.6 mA, Hold last mA out, or User definable. All of the MRL800 Tracking Panel variables are editable by the user but will not be recognized by the device until the Save/Send button is pressed.

## Tank Map Panel

The Tank Map Panel contains the same variables whether the device is offline or online. The Tank Map Panel contains the Tank map factor (P082), the Tank map min (P083), the Tank map max (P084), the Tank map window (P085), the Tank map bin Tol (P087), the Tank map pktol Lo (P088), the Tank map pktol Hi (P089), and the Tank map wid Tol (P090) variables which may be edited by the user whether the device is online or offline. The Create tank map (P080), the Enable tank map (P081), and the Tank map type (P086) are also displayed on the Tank Map Panel and may be changed by the user whether the device is online or offline. Both the Create tank map and Enable tank map variables may contain the values On or Off and the Tank map type may contain the values Derate or Delete. Changes to the device must be sent using the Save/Send buttons and the user may return to the Engineering Panel by pressing the Done button.

## Clutter Panel

The Clutter Panel contains the same variables whether the device is online or offline. The Clutter Panel contains the Clutter min dist (P093), the Clutter max dist (P094), and the Clutter map avg (P095) variables which may be edited by the user whether the device is online or offline. The Create clutter (P091), and the Enable clutter (P092) variables are also displayed on the Clutter Panel and may be changed by the user whether the device is online or offline. Both the Create clutter and Enable clutter variables may contain the values On or Off . Changes to the device must be sent using the Save/Send buttons and the user may return to the Engineering Panel by pressing the Done button.

## Bottom Tracking Panel

The Bottom Tracking Panel contains the same variables whether the device is offline or online. The Bottom Tracking Panel contains the Enable btm track (P096) variable which may contain the values On or Off and the Dielectric const (P097). Both variables may be edited by the user but will not be recognized by the device unless the Save/Send button is pressed. The Done button can be pressed to return to the Engineering Panel.

## System Panel

The System Panel consists of a row of buttons that when pressed will open various other panels; the user may choose from the Calibration Panel, the Settings Panel, the Antenna Panel, or the Fixed Panel. The MRL800 System Panel also displays the Auto cycle time (L103) variable for the user, this variable is editable on both the online and offline device frames, the user simply has to change the value of the text field and press save for an offline device or send for an online device.

## Calibration Panel

The Calibration Panel contains the same variables whether the device is online or offline. The Calibration Panel contains the Ref temp at cal (P60-11) and the Actual cal temp (P60-12) variables. Both variables may be edited by the user but will not be recognized by the device unless the Save/Send button is pressed. The Done button can be pressed to return to the System Panel.

## Settings Panel

The Settings Panel contains the same variables whether the device is online or offline. The Settings Panel contains the Sensor units (L200), the Transducer units (P60-16), the Echo units (P60-15), Temp units (P60-17), the Frequency units (P60-18), the Set fixed gain(P60-7), the Upper level gain (P60-8), the Lower level gain (P60-9), the Number samples (P60-22), and the Points to skip (P60-23) variables. All the variables contained on the Settings Panel may be edited

by the user but will not be recognized by the device unless the Save/Send button is pressed. The user can return to the System Panel by pressing the Done button.

## Antenna Panel

The Antenna Panel contains the same variables whether the device is online or offline. The Antenna Panel contains the Antenna type (P061), the Antenna offset (P062), and the Cable offset (P063) variables. The Antenna type may have the values 6 inch rod antenna, 4 inch core antenna, 6 inch core antenna, or User Defined. The Antenna type and Antenna offset variables may be edited by the user but will not be recognized by the device unless the Save/Send button is pressed. The user can return to the System Panel by pressing the Done button.

## Fixed Panel

The Fixed Panel contains the same variables whether the device is online or offline. The Fixed Panel contains the Model code (D949), and the EEPROM signature (D938) variables. The Model code may have the value MRL800 or MRL850 and may be edited by the user but will not be recognized by the device unless the Save/Send button is pressed. The user can return to the System Panel by pressing the Done button.

## Reading Variables Panel

### *Online Only*

When selected, the Reading Variables Panel continuously reads the included variables from the device and updates their values in the corresponding fields. These online device variables include the Range to target (D910), the Calc distance (D920), the Tank level (D921), the Process level (D922), and the Ground level (D923) variables along with their respective corresponding units. The Reading Variables Panel is only shown if the device is online. All variables contained in the Reading Variables Panel are read only and may not be altered by the user.

## DSP Panel

### *Online Only*

When selected, the DSP Panel continuously reads the included variables from the device and updates their values in the corresponding fields. These online device variables include the Light speed lwr (D917), the FBN of target (D931), the FFT size (D936), the Sampling frequency (D940) variables, as well as the Light speed air (D914), the Noise level (D932), the Target frequency (D939), the Sweep time (D943) and the Band width (D944) variables along with their respective corresponding units. The DSP Panel is only shown if the device is online. All variables contained in the DSP Panel are read only and may not be altered by the user.

## ESP Panel

*Online Only*

When selected, the ESP Panel continuously reads the included variables from the device and updates their values in the corresponding fields. These online device variables include the Front end gain (D930), the Echoes in spect (D913), the Echoes mapped (D933), the Clutt map in mem (D934), and the Tank map in mem (D935) variables, as well as the Target echo size (D911), the Temperature (D915), the ROI max (D924), and the ROI min (D925) variables along with their respective corresponding units. The ESP Panel is only shown if the device is online. All variables contained in the ESP Panel are read only and may not be altered by the user.

## History Panel

*Online Only*

Their respective corresponding units. The History Panel is only shown if the device is online. All variables contained in the History Panel are read only and may not be altered by the user.

## Maintenance Panel

*Online Only*

The Maintenance Panel consists of a row of buttons that when pressed will perform various tasks; the user may choose from the Additional Status, the Device Reset, the Loop Test, or the Current Trim operations.

## Additional Status

Pressing the Additional Status button on the Maintenance Panel opens the Additional Status panel. The Additional Status panel is a Read Only panel, the variables contained in this panel may only be viewed by the user not edited. This panel displays the additional status of this online MRL800 device, the user may choose to view the first status byte through the sixth status byte from the device. The first status byte parameters monitored by this panel include the ROM Checksum error status, the EEPROM Signature error status, the EEPROM Checksum error status, the RAM Test Failure status, and the Lost Echo error status which may be displayed by pressing the Status 0 button of the Additional Status panel. Pressing the Status 1 button will open the Status 1 Panel which monitors the second status byte of this device while pressing the Status 2 button will open the Status 2 Panel which monitors the third status byte of this device. The fourth status byte parameters monitored by this panel include the Creating Tank Map status, the Creating Clutter Map status, the Tracking Target status, the Recovering Target status, and the Searching for Target status. Pressing the Status 4 button will open the Status 4 Panel which monitors the fifth status byte of this device while pressing the Status 5 button will open the Status 5 Panel which monitors the sixth status byte of this device. If any of these status variables are flagged on the device, the checkbox text will be displayed as red and the check box will be

checked. Pressing the Done button on any of the Status panels will bring the user back to the Additional Status panel and pressing the Done button on the Additional Status panel will bring the user back to the Maintenance Panel of this MRL800 Device Frame.

## **Device Reset**

*Refer to the generic Maintenance Panel located in the main section of this manual for more information on the Device Reset operation.*

## **Loop Test**

*Refer to the generic Maintenance Panel description located in the main portion of this manual for more information regarding the Loop Test procedure.*

## **Current Trim**

*Pressing the Current Trim button of the Maintenance Panel will open the Current Trim window where the current trim data may be updated by the user. For more information on this procedure, please refer to the generic Trim Panel's Current Trim description located in the main section of this manual.*