Honeywell

STT750 Series HART Option User's Manual

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Honeywell Process Solutions

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Honeywell Process Solutions
1250 W Sam Houston Pkwy S
Houston, TX 77042

About This Manual

This manual provides the details of programming Honeywell STT750 SmartLine Temperature Transmitters for applications involving HART versions 5, 6, and 7 communication protocols. For installation, wiring, and maintenance information
refer to the *STT750 SmartLine Temperature Transmitter User Manual*, document number #34-TT-25-13.

The configuration of your Transmitter depends on the mode of operation and the options selected for it with respect to operating controls, displays and mechanical installation. Details for operations involving the Honeywell Multi-Communication (MC) Toolkit (MCT202/MCT404) are provided only to the extent necessary to accomplish the tasks-at-hand. Refer to the associated *MC Toolkit User Manual,* document # 34-ST-25-20 (MCT202), or 34-ST-25-50 (MCT404) for complete details. The "Reference" section in the front matter of this manual lists document titles and numbers.

The STT750 SmartLine Temperature Transmitter can be digitally integrated with one of two systems:

- Experion PKS: you will need to supplement the information in this document with the data and procedures in the *Experion Knowledge Builder.*
- Honeywell's TotalPlant Solutions (TPS): you will need to supplement the information in this document with the data in the *PM/APM SmartLine Transmitter Integration Manual*, which is supplied with the TDC 3000 book set. (TPS is the evolution of the TDC 3000).

Release Information

STT750 Series HART Option User Manual, Document # 34-TT-25-15 (this document)

Rev. 1.0,	August 2015,	1st Release
Rev. 2.0,	March 2016	CVD, Soft DO, NE89 and RTD Cu10, RTD Ni120 input details added

References

The following list identifies publications that may contain information relevant to the information in this document.

STT750 SmartLine Temperature Transmitter Quick Start Installation Guide, # 34-TT-25-14

SmartLine Temperature Transmitter w/ HART Comms Safety Manual, 34-TT-25-05

STT750 SmartLine Temperature Transmitter User Manual, # 34-TT-25-13

MC Toolkit User Manual, Document # 34-ST-25-20

PM/APM SmartLine Transmitter Integration Manual, # PM 12-410

STT750 Series Temperature, Transmitter, Agency IS Control Drawing, 50091227

MC Toolkit Modem Code Download Instruction Manual, Document # 34-ST-25-33

Patent Notice

The Honeywell STT750 SmartLine Temperature Transmitter family is covered by one or more of the following U. S. Patents: 5,485,753; 5,811,690; 6,041,659; 6,055,633; 7,786,878; 8,073,098; and other patents pending.

Support and Contact Information

For Europe, Asia Pacific, North and South America contact details, see back page or refer to the appropriate Honeywell Solution Support web site:

Honeywell Corporate   www.honeywellprocess.com

Honeywell Process Solutions   https://www.honeywellprocess.com/smartline-temperature/

Training Classes   http://www.automationccollege.com

Telephone and Email Contacts

Area	Organization	Phone Number
United States and Canada	Honeywell Inc.	1-800-343-0228 Customer Service 1-800-423-9883 Global Technical Support
Global Email Support	Honeywell Process Solutions	ask-ssc@honeywell.com

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1 STT750 Physical and Functional Characteristics

1.1 Overview

This section is an introduction to the physical and functional characteristics of Honeywell's family of STT750 SmartLine Temperature Transmitters.

1.2 Features and Options

The STT750 SmartLine Temperature Transmitter is available in a variety of models for measuring Thermocouples, RTD, Millivolts, and Volt or ohm sensor types. Table 1 lists the protocols, human machine interface (HMI), materials, approvals, and mounting bracket options for the STT750.

Table 1 – Features and Options

Feature/Option	Standard/Available Options
Communication Protocols	HART
Human-Machine Interface (HMI) Options (Basic Display)	Basic Digital Display
	Three-button programming (optional)
	Basic display language: English only
Calibration	Single
Approvals (See Appendix C for details.)	ATEX, CSA, FM, IECx, NEPSI
Mounting Brackets	Angle/flat carbon steel/304 stainless steel, Marine 304 stainless steel
Integration Tools	Experion, FDM and DTM

1.2.1 Physical Characteristics

As shown in Figure 1, the STT750 is packaged in one major assembly: the Electronics Housing. The elements in the Electronic Housing are connected to the process sensors, measure the process variables, respond to setup commands and execute the software and protocol for the different temperature measurement types. Figure 2 shows the assemblies in the Electronics Housing with available options.
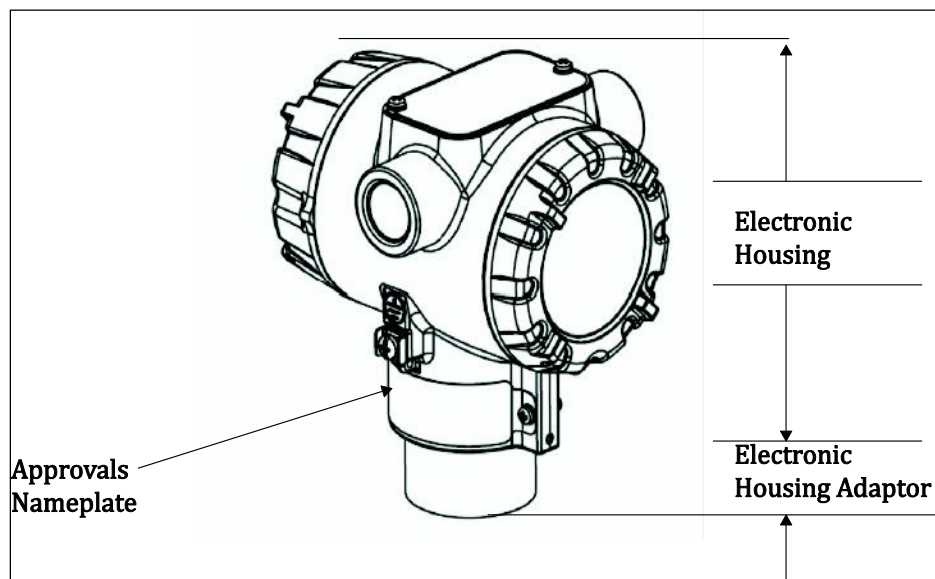
Figure 1 – STT750 Major Assemblies
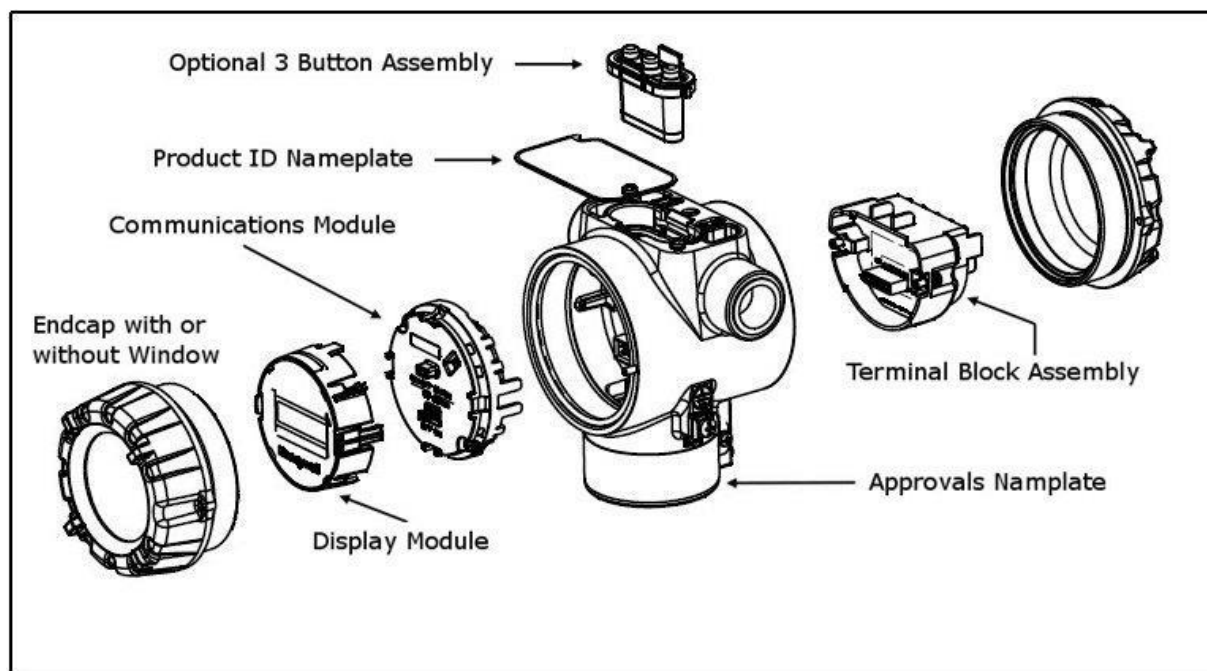
Figure 2 – Electronics Housing Components

1.2.2 Functional Characteristics

The Transmitter measures process Temperature and outputs a signal proportional to the measured process variable (PV). Available output communication protocols include analog 4 to 20 mA and HART protocol.

An optional 3-button assembly is available to set up and make adjustments to the Transmitter. In addition, a Honeywell Multi-Communication (MC) Toolkit (not supplied with the Transmitter) can facilitate setup and adjustment procedures in the case of HART.

1.3 STT750 SmartLine Transmitter NamePlate

The Transmitter nameplate mounted on the top of the Electronics Housing (see Figure 2) lists the model number, physical configuration, electronics options, accessories, certifications, and manufacturing specialties. Figure 3 is an example of a typical STT750 temperature Name plate. The model number format consists of a Key Number with several table selections.

Key	I	II	III	IV	V	VI	VII	VIII	IX
STT750	- _ -	_ -	_ -	___ -	___ -	_ -	____ -	__,__,__ -	XXXX

Figure 3 –Typical STT750 Nameplate

You can readily identify the series and basic Transmitter type from the key number. The letter in the third digit represents one of these basic transmitter types:

- T = Temperature

For a complete selection breakdown, refer to the appropriate Specification and Model Selection Guide provided as a separate document.

1.4 Safety Certification Information

An "approvals" name plate is located on the bottom of the Electronics Assembly; see Figure 1 for exact location. The approvals name plate contains information and service marks that disclose the Transmitter compliance information. Refer to Appendix A in the *STT750 SmartLine Transmitters User's Manual*, document number 34-ST-25-13 for details.

1.5 Transmitter Adjustments

Span adjustments are possible in new generation STT750 SmartLine Temperature Transmitters by using the optional 3-button assembly located at the top of the Electronic Housing, see Optional 3-Button Assembly on page 5. However, certain capabilities are limited in the following configurations:
- Without a display –Span setting only for a HART device.
- With a display – Complete Transmitter configuration is possible for a HART device.

For HART you can also use the Honeywell MC Toolkit or other third-party hand-held to make any adjustments to an STT750 SmartLine Temperature Transmitter. Alternately, certain adjustments can be made through the Experion or Universal Station, if the Transmitter is digitally integrated with a Honeywell Experion or TPS system.
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1.6 Local Display Options

The STT750 Temperature Transmitter has a Basic Digital Display; see Table 2
.

Table 2 – Available Display Characteristics

Basic Display	• Suitable for basic process needs
	• 360° rotation in 90° Increments
	• 8 configurable screens
	• 2 lines, 16 characters
	• Standard engineering units
	• Diagnostic messaging
	• Supports optional 3-Button configuration and calibration

1.7 Optional 3-Button Assembly

The optional 3-button assembly is located under the nameplate and provides the following features:

- Opportunity for immediate reaction with minimal disruptions
- Improved maintenance time
- Potential savings on hand-held units
- Suitable for all environments: hermetically sealed for long life in harsh environments
- Suitable for use in all electrical classifications (flameproof, dustproof, and intrinsically safe)

The 3-button assembly is externally accessible and provides the following capabilities:

- Menu-driven configuration with optional display:
    - Using increment, decrement & enter keys
    - A comprehensive on screen menu guides the way
    - Configure the transmitter
    - Configure the display
    - Set span
- Zero and span settings without optional display

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2 Communication Modes

2.1 Overview

The STT750 SmartLine Temperature Transmitter can be configured for operation with HART version 7 communication. This manual addresses the processes to configure and calibrate a Transmitter for HART communication.

2.2 HART Mode Communication

⚠️ When using MCT202/MCT404, but before connecting to a HART transmitter, verify that the FDC application is used and not the MC Toolkit application.

- Transmitters with HART capability have features that vary among manufacturers and with the characteristics of specific devices. The FDC software application executing on the MCT202/MCT404 supports the HART Universal, Common Practice and Device Specific Commands which are implemented in the Honeywell Transmitters.

As indicated in Figure 4, the output of a Transmitter configured for HART protocol includes two primary modes:
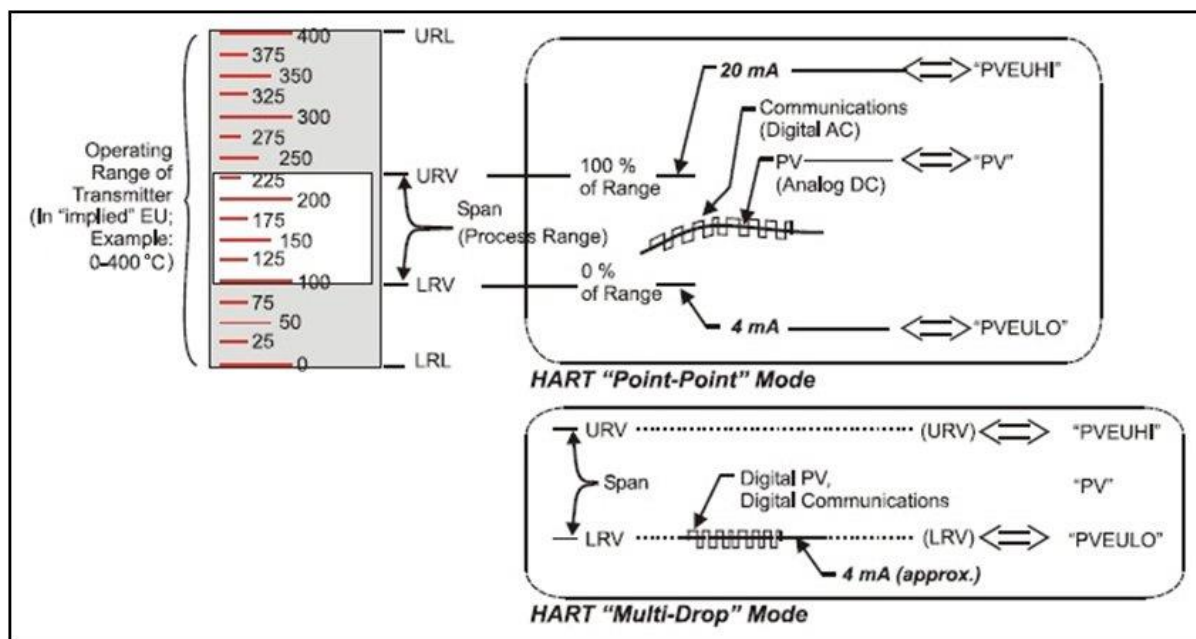
Figure 4 – HART Point-to-Point and Multi-drop Value Scaling

- Point-to-Point Mode, in which one Transmitter is connected via a two-conductor, 4-20 mA current loop to one receiver.
- Multi-Drop Mode, in which several Transmitters are connected through a two-conductor network to a multiplexed receiver device.

In point-to-point mode, the value of the primary Process Variable (PV) is represented by a 4-20 mA current loop, almost identical to that of a Transmitter operating in analog mode. You can also have one device in analog output mode when you are configured as multi-drop. In this case, however, the analog signal is modulated by Frequency Shift Keying (FSK), using frequencies and current amplitude that do not affect analog sensing at the receiver. The accuracy of the analog level must be precisely controlled for accurate sensing. HART communication will not *bump* process variables.

In multi-drop mode, up to 16 transmitters in HART 5 (addresses 0-15) and up to 64 transmitters in HART6/7 (addresses 0-63) can exist on the two-conductor network.

3 Configuration Tools and Interfaces

3.1 Overview

This section describes the tools and interfaces involved in configuring a new STT750 SmartLine Temperature Transmitter for HART communication operation. The information in this section also applies to adjusting the configuration of a Transmitter that has been in operation and updating one that is currently in operation.

3.2 Pre-requisites

The information and procedures in this manual are based on the assumption that personnel performing configuration and calibration tasks are fully qualified and knowledgeable in the use of the Honeywell MC Toolkit or MCT202/MCT404. The name MC Toolkit or Toolkit and MCT202/MCT404 are used interchangeably as MCT202/MCT404 is the model name for the Honeywell MC Toolkit product. Furthermore, we assume that the reader is intimately familiar with the STT750 family of SmartLine Temperature Transmitters and thoroughly experienced in the type of process application targeted for Transmitter deployment. Therefore, detailed procedures are supplied only in so far as necessary to ensure satisfactory completion of configuration tasks.

3.3 Application Design, Installation, Startup, and Operation

The *STT750 SmartLine Temperature Transmitters User's Manual*, document number 34-ST-25-13, provides the details for application design, installation, and startup; see Table 3 for topics.

Table 3 – User Manual Related Topics

STT750 SmartLine Temperature Transmitters Users Manual		
Section 2. Application Design	**Section 3. Installation and Startup**	**Section 4. Operation**
Safety and accuracy Diagnostics messages Design consideration	Site evaluation Toolkit issues Display installation concerns Transmitter mounting & zero-correction Wiring Startup tasks and procedures	Three-button option Failsafe direction setup Monitoring displays

3.3.1 Organization

This information in this section is arranged in the following sequence:

- MC Toolkit participation in STT750 Transmitter Setup and Configuration:
    - Physical circuit connections
    - Application components
    - Configuration for Analog and HART operation
- STT750 Transmitter
    - Basic display
    - Health indications
    - Ability to be configured and operate in a process system

3.4 MC Toolkit Participation

Before using the MC Toolkit, be sure that you are aware of the potential consequences of each procedure, and that you use appropriate safeguards to avoid possible problems. For example, if the Transmitter is an element in a control loop, the loop needs to be put in manual mode, and alarms and interlocks (i.e., trips) need to be disabled, as appropriate, before starting a procedure.

3.4.1 MC Toolkit Software Applications

The MC Toolkit has two software applications to work with STT750 SmartLine Temperature Transmitters:

- **Field Device Configurator (FDC)**. This application is used for configuring, calibrating, monitoring, and diagnosing HART devices. FDC conforms to the IEC 61804-3 EDDL (Electronic Data Description Language) standard specification. The FDC application is an open solution that supports devices with a registered device description (DD) file compatible with HART Communication Foundation (HCF) requirements.

Details for working with the MC Toolkit are provided in the *MC Toolkit User Manual,* document # 34-ST-25-20 (MCT202), or 34-ST-25-50 (MCT404). In subsequent sections of this manual, explicit operating instructions are provided only in so far as necessary to complete required tasks and procedures.

3.4.2 Configuration Databases

The MC Toolkit is used to establish and/or change selected operating parameters in a Transmitter database.

3.4.3 Configuration

Configuration can be accomplished both online and offline with the Transmitter powered up and connected to the MC Toolkit. Online configuration immediately changes the Transmitter operating parameters. For offline configuration, Transmitter operating characteristics are entered into Toolkit memory for subsequent downloading to a Transmitter.

When you set up or configure a Transmitter, it can take up to 30 seconds for the value to be stored in it. If you change a value and Transmitter power is interrupted before the change is copied to nonvolatile memory, the changed value will not be moved to nonvolatile memory.

3.4.4 MC Toolkit–Transmitter Electrical/Signal Connections

Figure 5 displays how to connect the MC Toolkit directly to the terminals of a HART-only Transmitter (bottom).
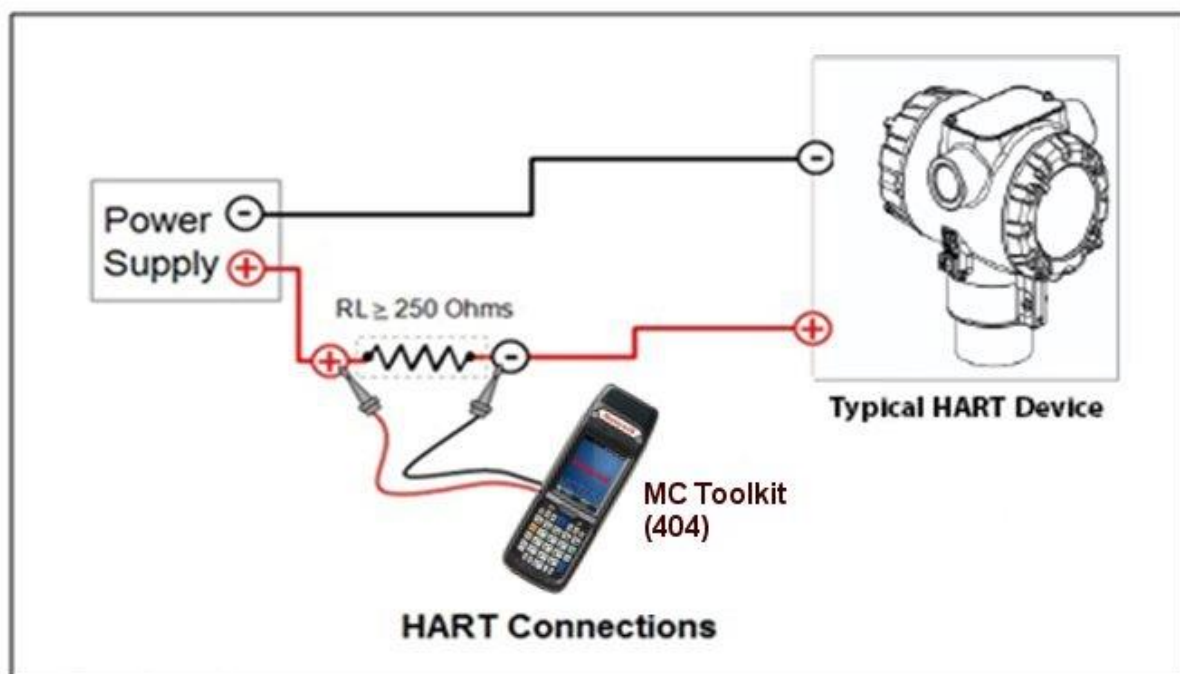
Figure 5 – MC Toolkit-Transmitter Electrical/Signal Connections

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4 HART Transmitter Configuration

4.1 Overview

Each new STT750 Temperature Transmitter configured for HART protocol is shipped from the factory with a basic configuration database installed. This basic configuration database must be edited or revised to meet the requirements of your process system. The process in this section assumes that you will use the **Field Device Communicator (FDC)** application for HART configuration tasks. The **FDC** application provides the facilities for the online and offline configuration of Transmitters operating with HART protocol

Online configuration requires that the Transmitter and MC Toolkit are connected and communication between the two has been established. Online configuration provides a set of functions with which to perform various operations on a HART communication network through an active communication link. These operations primarily include configuration, calibration, monitoring, and diagnostics. Typically, these operations could be realized through various constructs exposed by the Device Description (DD) file. In addition, the **FDC** application provides some functions for convenient execution of these functions.

Offline Configuration refers to configuring a device when the device is not physically present or communicating with the application. This process enables you to create and save a configuration for a device, even when the device is not there physically. Later when the device becomes available with live communication, the same configuration can be downloaded to the device. This feature enables you to save on device commissioning time and even helps you to replicate the configuration in multiplicity of devices with lesser efforts. Currently, FDC does not support creating offline configuration. However, it supports importing of offline configuration from FDM R310 or later versions. The configurations thus imported can be downloaded to the device from FDC.
The following are the tasks that you need to perform for importing offline configuration in FDC application software and then downloading it to the device.

- Create offline configuration template in FDM
- Save the configuration in FDM in FDM format.
- Import the offline configuration in FDC
- Download the offline configuration to the device

Note: For details on creating and using offline configuration, refer to section Offline configuration in FDM User's Guide.

4.1.1 Personnel Requirements

The information and procedures in this section are based on the assumption that the person accomplishing configuration tasks is fully qualified and knowledgeable on the use of the MC Toolkit and is intimately familiar with the STT750 family of SmartLine Temperature Transmitters. Therefore, detailed procedures are supplied only in so far as necessary to ensure satisfactory configuration. The other HART configuration Tools are Honeywell Experion in conjunction with FDM, iDTMs running on FDM or Pactware, and Emerson 375/475. The organization of Device Configuration and Parameter Descriptions on page 24 is given in Table 6.

4.2 Overview of FDC Homepage

The FDC homepage consists of links for Online Configuration, Offline Configuration, Manage DDs, and Settings. See below.
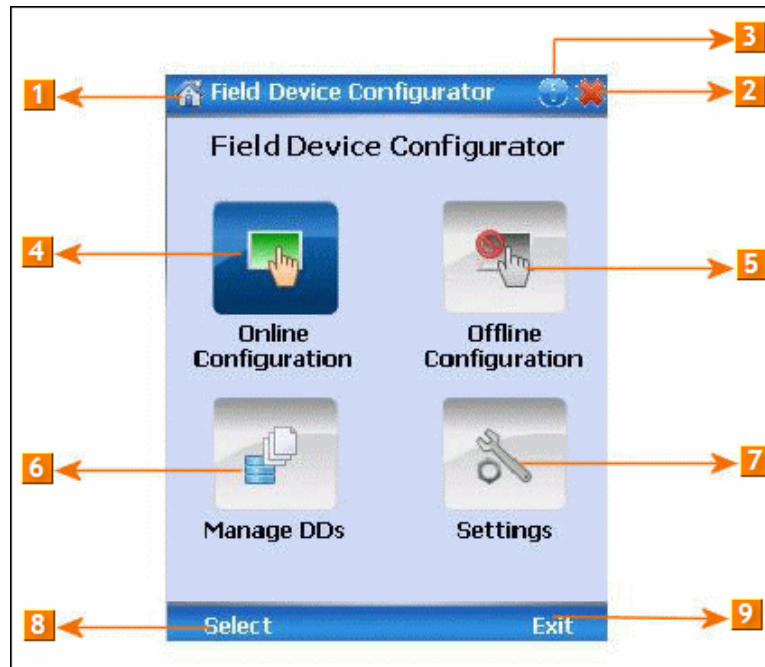
Figure 6 – FDC Homepage

Table 4 lists the items that appear on the FDC homepage and its descriptions.

Table 4 – FDC homepage elements

Items	Description
1	Screen title.
2	Tap to quit FDC.
3	Tap to view the application information.
4	Tap to navigate to Online Configuration screen.
5	Tap to navigate to Offline configuration screen.
6	Tap to navigate to Manage DDs screen.
7	Tap to navigate to Settings screen.
8	Tap to select the highlighted menu option.
9	Tap to quit FDC.

Note: To select a particular option in FDC you can either select the option and then tap **Select** or you can directly double-tap the option.

4.2.1 Settings

Use this feature to customize FDC. You can customize FDC for device detection, DD selection, and other application settings.

4.2.1.1 Device Identification

Use the following options to configure FDC to identify a device.

- **Using Poll Address**
    - **Use poll address 0 only:** Use this to detect a device with the poll address as zero.
    - **Find first poll address and use**: Use this to detect a device with the first available poll address in the range of poll addresses that are available.
    - **Use selected poll address**: Use this to detect a device with a specific poll address in the range of zero to 63.
    - **Use From**: Use this to detect a device based on a range of poll addresses.
- **Using Device TAG**: Use this to detect a device with a known HART tag.
- **Using Device LONG TAG**: Use this to detect a device with a known HART long tag (applicable for devices with HART 6 or later Universal revisions).

Note: If you choose the option Using Device TAG or Using Device LONG TAG, FDC prompts you to enter a device tag/long tag name during device detection.

4.2.1.2 DD selection

Use the following options to configure FDC to select DD files when a DD with matching device revision is not available.

- **Use DD file of previous device revision**: Use this option to automatically communicate using a DD file having device revision lower than that of the device.
- **Use generic DD file**: Use this option to automatically communicate to the device using an appropriate generic DD file.
- **Always ask user**: Use this option to always prompt you with a choice for communicating to the device either using the previous device revision or using a generic DD file.
- **Always Use Generic**: Use this option to always communicate to the device using generic DD files even if a DD file with matching device revision as the device is present.

Note: A generic DD file is a DD file that provides access and interface to the universal data and features of a HART device.

4.2.1.3 Other settings

Low storage notification: Use this option to set a percentage value and to notify you with a warning message when the available storage card space is less than the percentage set.
Application diagnostics: Use this option to enable or disable the logging infrastructure for application diagnostics. With this option enabled, FDC creates necessary log files for troubleshooting and diagnostics. These files are stored in SD Card\FDC folder.
Note: You must not enable this option unless suggested by Honeywell TAC because this may impact the application performance.

4.2.2 Manage DDs

Using this feature, you can manage the DD files installed with FDC. A DD file contains descriptive information about the functionality of a device. By default, a set of DD files are installed with FDC. However, if you do not have a DD for a given device, you can install it using the "Add DD" feature. Similarly, you can uninstall a DD file or a set of DD files using "Delete DD" feature. You can also directly copy the DD files in appropriate hierarchy using a card reader or "Active Sync/Mobile Device Center" mechanisms. In such a case, you should validate the library view using the "Refresh" feature.

4.2.2.1 Overview

Using Manage DDs, you can view, add, or delete DD files for devices. A list of already available DD files is maintained in the DD Library. FDC lists the installed DD files in a hierarchy as below:

> Manufacturer
>> Device Type
>>> DevRev xx, DDRev yy
>>> DevRev pp, DDRev qq

4.2.2.2 Add a DD file

To add a DD file for a device, perform the following steps.

1. From the FDC homepage, tap Manage DDs > Select.

    The **Manage DDs** dialog box appears.

2. Tap **Options** > **Add DD**.

Or

Tap .

The **ADD DD files** dialog box appears.

3. Browse to the location in which the DD file (**.fm8**) is located and tap **OK**.

4. If the DD file already exists, then the following message appears.
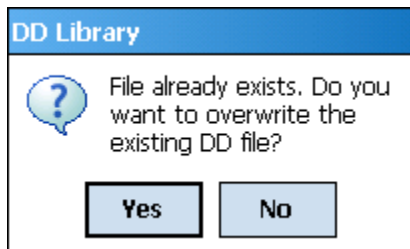
5. Tap **Yes** to overwrite the existing DD files.

6. If the DD file is added successfully, a success message appears.

4.2.2.3 Delete a DD file

Using this option, you can delete a particular version of a DD file. To delete a DD file for a device, perform the following steps.

1. From the FDC homepage, tap **Manage DDs** > **Select**.

The **Manage DDs** dialog box appears.

2. You can choose to delete DD(s) in one of the following ways:

    a) By device manufacturer – Select a device manufacturer to delete all device types and DDs associated with the manufacturer's devices.

    b) By device type – Select a device type to delete all DDs associated with the device.

    c) By device revision and DD revision – Select the specific entry of device revision, DD revision to delete the specific DD

3. Tap **Options** > **Delete DD.**

 Or

Tap .

A confirmation message appears.

4. Tap **Yes**.

If the DD file is deleted successfully, a success message appears.

5. Tap **OK** to return to **DD Library** page.

4.2.2.4 Validating a manually edited library

Besides using the Add/Delete DD features, advanced users may also manipulate a DD library by directly editing the contents of the FDC\Library folder. DD files can also be transferred directly to this location by accessing the SD Card on MCT101 through a card reader and/or by connecting the MCT202 or MCT404 to a PC. In such cases, you must perform the following steps to validate a DD Library, thus edited manually:

1. From the **FDC homepage**, tap **Manage DDs** > **Select**

 The **Manage DDs** dialog box appears

2. Tap **Options**.

3. Tap **Refresh Library**.

    Or

Tap .

A confirmation message appears.

4. Tap **Yes**. The DD library is now validated and refreshed.

4.2.3 Online configuration

Using online configuration, you can configure, calibrate, monitor and diagnose a HART device which is connected to MC Toolkit. FDC provides the features to perform these functions through the various constructs offered through the DD file of the device. Besides there are certain other features available under this link for you to conveniently work with a HART device with live communication. After making changes to the device you can also save a snapshot of the device data as history to later transfer it to FDM for record and audit purposes.

4.2.4 Offline configuration

Offline configuration refers to configuring a device offline (without physically connecting to the device) using a template and then downloading the configuration to the device. Presently, FDC application software does not support creating offline configuration. However, it supports importing of offline configuration from FDM (R310 and above).

4.2.5 Online Configuration Overview

Online Configuration option provides you a set of functions with which you can perform various operations on a device with an active communication link. These operations primarily include configuration, calibration, monitoring, and diagnostics of a HART device. Typically, these operations could be realized through various constructs exposed by the DD file of the device. In addition, FDC also provides some additional application functions for you to perform these functions more conveniently.

Online configuration includes a set of functions to perform various operations on a Transmitter with active communication link. These operations primarily include:

- Identifying a Transmitter
- Reading and reviewing Transmitter variable values
- Editing Transmitter variable values
- Downloading the selected/edited variable set to the Transmitter

4.2.5.1 Detecting and loading a device

Tap the **Online Configuration button on the Application Home page.**

The device detection and loading process automatically gets started. Depending upon the Device Detection and DD Selection settings you may have chosen, you may be prompted for certain inputs as described in the **Settings** section.

4.2.6 Overview of Device Homepage

Once the device is detected and loaded successfully, you can view the device homepage for the identified device.

The workspace area on the device homepage consists of 4 tabs on the left hand side. Selecting a tab displays functions/information associated with that tab on the right hand side.
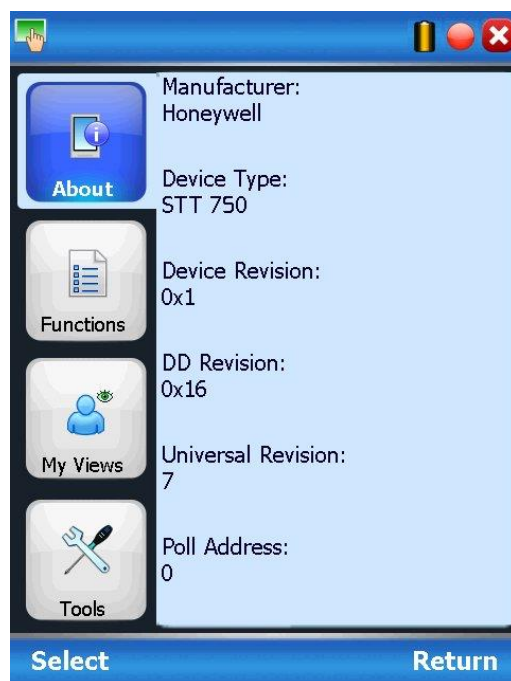
Figure 7 – Device Homepage

Table 5 lists the device health status and their indications.

Table 5 – Device health status

Device health icons	Indications
	Indicates there's no health or status indicators reported by the device
	Indicates that the device is potentially reporting a status which needs attention and further investigation. It is advised that you use Device Status under Functions tab to further investigate the details.
	Indicates that the device has lost communication with MC Toolkit

4.2.7 Tabs on the Device Home page

The following are the options that are available on the device homepage

- **Information tab**: Use this option to view the device identity related information. You can view the manufacturer name, device type, device revision, DD revision, and universal revision of the HART device.
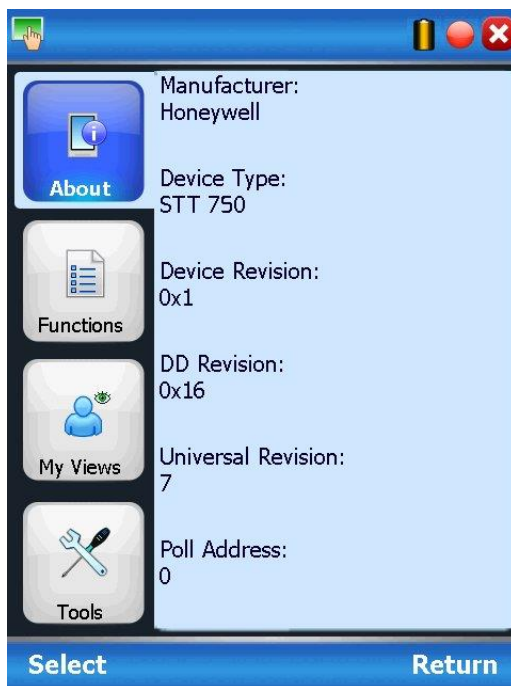
- **Functions tab**: This tab provides various options which you may use for navigating through the device specific user interface and some standard features offered by FDC across all devices. For the sake of explanations, the right side options under this tab shall be referred as "Entry points" throughout the rest of the document.

- **My Views tab:** Quite often, you may be interested only in a set of variables of a device. But navigating through the menu tree of a device may not be helpful because of time and further all variables that you want may not be in the same location. Using this unique feature of FDC, you can now choose what you want to view in a device in your own views. FDC allows you to create two such views per device revision of a specific device type. You can always modify them as per your needs.

- **Tools tab:** This tab is a placeholder for FDC specific tools for providing certain functionality. Currently the only option it provides is called as Save History. Using this option you can save the snapshot of the device variables. This snapshot is saved in a format which can be later imported as a history record in FDM.

4.2.8 Using FDC for various device operations

Typical operations with a smart field device involve configuration, calibration, monitoring, and diagnostics. FDC enables you to achieve these operations with a HART device via the various interfaces/constructs exposed through the DD file of the device.

The "Functions" tab under the device home page provides the entry points for navigating through the device specific user interface to perform the above mentioned operations. A device may define up to four entry points in the DD file. All devices shall have at least one entry point, generally referred to as "Online". Besides the device specific entry points, FDC provides custom entry points for navigational aids to specific types of information/features. One such entry point is called Device Status, which is used for reviewing device health. Another is called Methods List, which is used to navigate to all the methods available in a device.

All of the device specific entry points represent the device interface, as explained using the Online entry point as an example. All the other device specific entry points have a similar interface except for the fact that the variables and other DD constructs provided under each may vary as indicated by the title of each entry point.

For the sake of explanation, the pages that appear on navigating through the device specific entry points are referred to as "Device Configuration" pages in this document. However it must be noted that this does not prohibit you from performing other device operations as explained above.

Online Device Entry Point: When you tap on to open the Online tab, the device configuration screen appears as shown below.
Typical Online Menu is shown below. Based on the connected Device type, Menu items will be shown
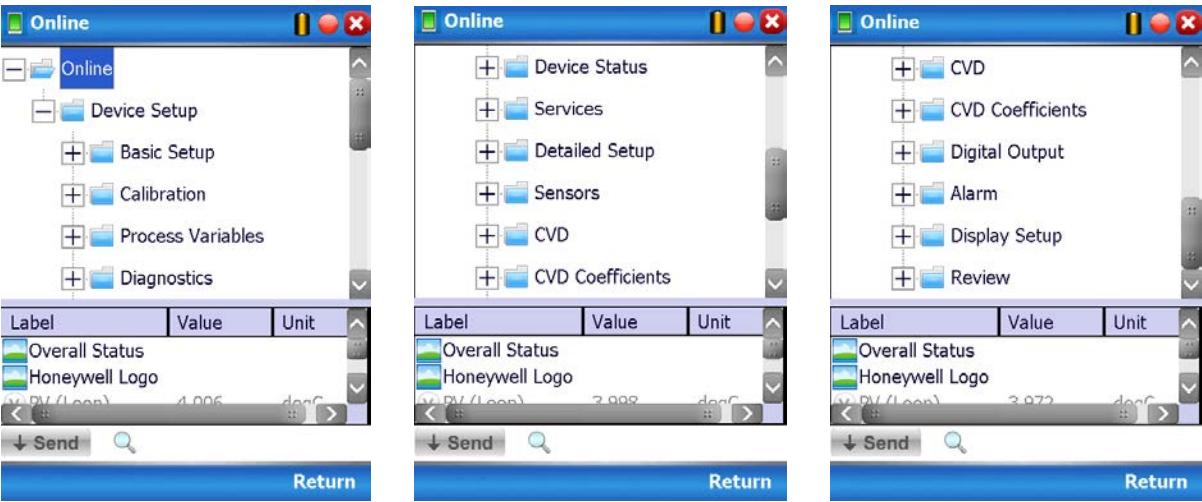
Alternately you can access the full EDDL features by selecting the "My Device" Tab. Typical My Device Tab is shown. Based on the connected device type Menu items will be shown
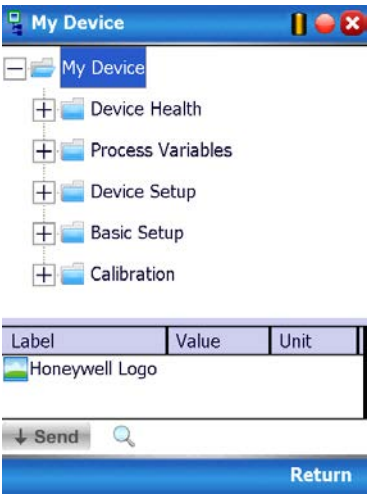
Navigate through the Menus to access various functions. See Table 6 for lists all the parameters in the STT750.

4.2.9 Device Configuration and Parameter Descriptions

Table 6 lists descriptions of all parameters for a HART Transmitter with the Online tab menu path. The same parameters may be accessed via the Shortcuts menu under the My Device tab.

Table 6 – HART Transmitter Parameters

Online Menu Flow	Parameter menu/ name	Description/Valid values
Online/PV (Loop)	PV	Displays the current value of the Primary Variable (loop PV according to the control mode selected) in user selected engineering units
Online/SV (CJ) temperature	SV (CJ temperature)	Displays the current value of the Secondary Variable (CJ Temperature) in user selected engineering units
Online/PV Loop current	PV Loop current	Displays the current value of Analog Output in mA
Online/PV % rnge	PV % rnge	Displays the current value of transmitter Output in %
Online/PV LRV	PV LRV	Displays the current value of the Lower Range Value (input which represents 0% output) in user selected engineering units. This value may be configured to any value within the range as per selected loop control mode (It will be computed depending on LTL and UTL,
Online/PV URV	PV URV	Displays the current value of the Upper Range Value (input which represents 100% output) in user selected engineering units. This value may be configured to any value within the range as per selected loop control mode (It will be computed depending on LTL and UTL.
Online/ TV Sensor	TV Sensor	Displays the sensor input value
Online/Device Setup/Basic Setup/Device Information/ STT750 Device	STT750 Device	Photograph of an STT750 Temperature Transmitter
Online/Device Setup/Basic Setup/ Device Information/ System Connections	T/C, RTD, mV/V, Ohm connect	Wiring diagram representing typical connections for different sensor input types for the STT750 Temperature Transmitter
Online/Device Setup/Basic Setup/ Device Information/ STT750 Assembly	STT750 Assembly	Parts assembly diagram of an STT750 Temperature Transmitter

Online Menu Flow	Parameter menu/ name	Description/Valid values
Online/Device Setup/Basic Setup/ Device Information	Honeywell Logo	Photograph of an STT750 Temperature Transmitter along with the official "Honeywell" logo
	Manufacturer	Displays Manufacturer of the STT750 Temperature Transmitter: Honeywell International
	Model	Displays Model number of the STT750 Temperature Transmitter: STT750
	Transmitter Install Date	Enter the date of site installation. This is a one-time only configuration.
	Tag	Enter tag identification up to eight alphanumeric characters.
	Long Tag	Enter a long tag name up to 32 alphanumeric characters.
	Cfg chng count	Configuration Change Counter – this counter keeps track of the number of times any configuration parameter has been changed
	Date	Enter a date for user information only.
	Descriptor	Enter a descriptor for user information only (up to 16 alphanumeric characters)
	Message	Enter a message up to 32 alphanumeric characters) that will be sent to the Display. The message will be shown on the Display interspersed with the configured screens. To stop displaying the message, select "Clear Display" in the Device Information menu.
	Clear Message	Selecting this option clears the "Message" and it will no longer be sent to the Display.

	Range values	Displays all of the range information for the device. The following limits are read only:
		        LRL: Lower range limit
		        URL: Upper range limit
		        LTL: Lower transducer limit
		        UTL: Upper Transducer limit
		
		The following may be configured to desired zero and span ranging for the application:
		        LRV: Lower Range Value (input which represents 0% output)
		        URV: Upper Range Value(input which represents 100% output)
		Valid configurations for LRV and URV range from LTL to UTL.

	Model Number	Displays the full order model number of the STT750 Temperature Transmitter

Online/Device Setup/Basic Setup/ Device Information	Maint Mode	Displays the Maintenance mode set by Experion PKS. When a HART device requires maintenance, the engineer or the operator changes the **PV Source** value of the corresponding AI channel to **MAN**. As soon as the **PV Source** value is changed for the channels connected to the STT750 transmitters, Experion communicates the channel mode status to the corresponding STT750 transmitters. Upon receiving this status, if the value is **MAN**, the transmitter displays an **M** and **Available for Maintenance** on the local display of the transmitter. The status display on the transmitter ensures that the field technician can locate and perform the maintenance work on the correct transmitter without impacting the integrated devices in the process loop. The transmitter continues to display the **Available for Maintenance** status on its local display until the **PV Source** status of the corresponding AI channel is changed to **AUTO** / **SUB** or the transmitter is power cycled. For more information, refer to the Experion Knowledge Builder
	Device ID	Displays the HART unique long address of the STT750 Temperature Transmitter
	Final Asmbly num	Displays the final assembly number of the STT750 Temperature Transmitter
	Universal rev	Displays the HART Universal Revision of the STT750 Temperature Transmitter
	Fld dev rev	Displays Field Device Revision of the STT750 Temperature Transmitter
	Software rev	Displays the Electronics Board Software Revision of the STT750 Temperature Transmitter

	Loop current mode	Select the Loop Current Mode configuration:
		    "Enable": enables loop current mode
		        (analog output will operate as a 4 to 20 mA signal consistent with the transmitter output)
		    "Disable": disables loop current mode
		        (analog output will be fixed at 4 mA)

Online/Device Setup/Basic Setup/ Device Information *(Continued …)*	PV Unit	Select one of the pre-programmed engineering units. STT750 Temperature readings can be displayed in the following engineering units: °C, °F, °Kelvin, °R, mV, Ohms
	PV Damp	Enter a value for damping of the device output. Entries may be any value from 0.00 to 102.00 seconds.
	SV Unit	Select the desired unit for measurement of the Secondary Variable (Cold Junction Temperature) Selections available are: °C, °F, °R, Kelvin.
	Write Protect	Displays the current configuration of the write protect function. Write Protect is "Enabled" if either the write protect jumper on the electronics board is in the "ON" position or the firmware write protect has been enabled.
Online/Device Setup/Calibration	PV Levels	Displays a graphic representation of all PV ranges and limits for the STT750 Temperature Transmitter

	Calibration Methods	The following calibration methods are available:
		
		   Apply Values: performs a Set LRV and/or Set URV to configure the LRV/URV to applied inputs.
		
		   D/A Trim: perform an analog output calibration at 4.00 and 20.00 mA (0% and 100% output).

	Sensor Calibration	Sensor URV Correct : Perform an input calibration correction by applying process input at the configured High calibration Point. Sensor LRV Correct: Perform an input calibration correction by applying process input at the configured Low calibration Point. Sensor Reset Corrects: Clear all user calibration adjustments. Correct URV Records: Displays the time and date history records for the last three URV Correct calibrations. Correct LRV Records: Displays the time and date history records for the last three LRV Correct calibrations. Reset Sensor Corrects Records: Displays the time and date history records for the last three times Reset Corrects was issued.

	PV Meter	Displays a gauge meter representation of the current value of the Primary Variable (temperature input)
Online/Device Setup/Process Variables	PV (Loop)	Displays the current value of the Primary Variable (temperature input) in user selected engineering units
	Trend of PV	Displays a trending chart of the current value of the Primary Variable (temperature input)
	SV Meter	Displays a gauge meter representation of the current value of the Secondary Variable (CJ temperature)
	SV (CJ) Temperature	Displays the current value of the Secondary Variable (CJ temperature) in user selected engineering units
	Trend of SV	Displays a trending chart of the current value of the Secondary Variable (CJ temperature)
	TV Meter	Displays a gauge meter representation of the current value of the Tertiary Variable (Sensor temperature)
	TV Sensor	Displays the current value of the Tertiary Variable (Sensor temperature) in user selected engineering units
	Trend of TV	Displays a trending chart of the current value of the Tertiary Variable (Sensor temperature)
	Sensor1 Resistance	Display Sensor Resistance
	ET Meter	Displays a gauge meter representation of the current value of the Electronics Temperature
	ET	Displays the current value of Electronics Temperature in degrees C
	Trend of ET	Displays a trending chart of the current value of the Electronics Temperature
	AO Meter	Displays a gauge meter representation of the current value of the Analog Output
	Trend of AO	Displays a trending chart of the current value of the Analog Output
	PV AO %	Displays a bar graph of the current value of the Analog Output
	PV % rnge	Displays the current value of transmitter Output in %

	Overall Status	Displays a pictorial representation of the current device status
	Critical	Displays all possible Critical Status faults and indicates OFF for inactive faults or ON for active faults.
	Help – Critical Diagnostics	Provides a more detailed description of each Critical Status fault
	Non-Critical	Displays the first set of possible Non-Critical Status faults and indicates OFF for inactive faults or ON for active faults.
	Help – Non-Critical Diagnostics	Provides a more detailed description of each of the first set of Non-Critical Status faults
Online/Device Setup/Device Status	Non-Critical	Displays the second set of possible Non-Critical Status faults and indicates OFF for inactive faults or ON for active faults.
	Help – Non-Critical Diagnostics	Provides a more detailed description of each of the second set of Non-Critical Status faults
	Status group 3	Displays the third set of possible Non-Critical Status faults and indicates OFF for inactive faults or ON for active faults.
	Help – Non-Critical Diagnostics	Provides a more detailed description of each of the second set of Non-Critical Status faults
	Ext dev status	Displays all possible Extended Device Status faults and indicates OFF for inactive faults or ON for active faults.
	Additional Status	Displays an advanced diagnostic detailed breakdown of all Critical and Non-Critical faults
Online/Device Setup/Diagnostics	Adv Diagnostics	Displays Advanced Diagnostics details for tracking basic device operation. For more detailed information on Advanced Diagnostics, refer to HART Advanced Diagnostics section in this Manual. Diagnostic information includes: Installation and Device Life details ET Tracking details Operating Voltage details AVDD Tracking details Sensor CPU Temp. Tracking details Power Up Diagnostics details
	Config History	Displays a history of the last five configuration parameters that have been changed.
	Error Log	Available to enable and disable error logging. If error log is enable all critical errors triggered will be logged with a time stamp.
	Variables Monitoring	PV Tracking CJ Tracking
Online/Device Setup/Services	Write Protection	Displays a picture of the Electronics module to demonstrate how to connect the hardware write protect jumper.
	Write Protect	Displays the current configuration of the write protect function. Write Protect is "Yes"(enabled) if either the write protect jumper on the electronics board is in the "ON" position or the firmware write protect has been enabled.

	Write Protect On/Off	Configure the firmware write protect option. Write Protect selections are: "Enable": enables the firmware write protect option (changes in configuration parameters will not be permitted). "Disable": disables the firmware write protect option (requires a password). A 4-digit password is required to change the Write Protect option from "Enabled" to "Disabled" to allow configuration changes. The default password is "0000", and can be re-configured by the user.
	Change Password	Change the write protect password to a new 4-digit code.
	Tamper Mode	Displays the current configuration of the Tamper detection feature (outside attempts to change device configuration when Write Protect is enabled and Tamper Mode is Enabled or Tamper Mode alone is Enabled). Refer to the "Tamper Reporting Logic and Write Protect Logic" in Table 7
Online/Device Setup/Services	Attempt Counter	Displays the number of times a tamper attempt (configuration write) has occurred. This parameter works as below: 1) The attempt counter will get reset on following instances: - When tamper is reset using the "Reset Tamper Counter" Method. - When Tamper Mode is configured. During the configuration, if the Tamper Mode is Enabled and the other Tamper parameters are configured, then that is also considered as a Tamper Attempt. 2) When tamper attempts are already incremented, if tamper is reconfigured then following happens, - If the reconfigured value is greater than tamper attempts, then the tamper attempts value is retained. If the reconfigured value is smaller than tamper attempts, then the tamper attempts value is clamped to the reconfigured attempts.

Online/Device Setup/Services	Tamper Latency	Displays the current setting of the Tamper Latency (0-60 seconds). **Tamper latency is the time period for which the tamper alarm remains set in response of command 48 and reflected as "Tamper Alarm" Device Status condition.**
	Max Attempts	Displays the current setting for the Tamper Maximum Attempts configuration. This is the maximum number of tamper attempts to be permitted during one Latency period before setting the Tamper Alarm status.
	Configure Tamper Mode	Configure all of the settings controlling the Tamper Detection option. Selections include: Select Tamper Mode: enable or disable tampering detection. When enabled, the "Tamper Counter" will keep track of the number of times an attempt is made. After the configured "Max Attempts", an alarm status is generated. Tamper Latency: Configure the desired latency (in seconds) for the Tamper detection. Maximum Attempts: Configure the maximum number of tamper attempts allowed before the device sets the Tamper Alarm status
	Reset Tamper Counter	Reset the Attempt Counter to zero.
	Master Reset	Selecting this option will cause a Master Reset of the transmitter, which is the equivalent to power cycling the device.
	Loop Test	This function enables the user to test the Analog Output measurement at any value over the full operational range. Select a current value to apply to the output and verify the measured current on the loop with a calibrated meter. Note that this function is only available when "Loop mA" (Loop Current mode) is Enabled.
	Lock/Unlock Device	Select the Lock state for access by HART configuration tools. If "Yes" is selected to lock the device, also select "Yes" or "No" to choose whether or not the lock is "permanent." If the lock is not permanent, it will be cleared on power cycle or Master Reset of the device. If "Yes" is selected to unlock the device, the lock state will be cleared.

	NAMUR Option	Select from the following: Namur Selection: select to enable or disable the Namur option for the output. (Refer to the PV Ranges/Limits chart) for effect on output signal. Namur Level: Displays a diagram of the operating range and failsafe range of the Analog output for Normal and Namur configurations. Displays the information related to the Sensor Type, Sensor ID Allows user to configure the low cal point and high cal point of sensor as per requirement. Displays the LTL, UTL and LRL, URL values of sensor
Online/Device Setup/Detailed Setup	Signal Condition	The following signal control parameters may be configured in this menu: PV Damp: Enter a value for damping of the device output. Entries may be any floating point value from 0.00 to 102.00 seconds. PV URV: Upper Range Value or span (input which represents 100% output). Range of entries is from LTL to UTL. PV LRV: Lower Range Value or zero (input which represents 0% output). Range of entries is from LTL to UTL. PV % range: Displays the current value of AO (analog output) in % CJ Compensation: Select Internal or Fixed Cold Junction Compensation for the temperature measurement. If Internal Compensation is selected, then the Cold Junction temperature is measured using an internal sensor. If Fixed Compensation is selected, then the Fixed Cold Junction Temperature Value must be configured and this value is then used for the Cold Junction temperature. CJ Selection: The value selected in the CJ Compensation method described above. Fixed CJ Compensation Value: If Fixed CJ Compensation has been selected, enter the desired fixed value of Cold Junction temperature here. Value must be between -50 and 90°C

Online/Device Setup/Detailed Setup	Output Condition	The following output-related values and operations are available in this menu: Poll Address: Select HART short address 0 to 63. PV Alm Type: displays the current position of the failsafe jumper on the electronics board (upscale/lowscale burnout) Loop current mode: Select the Loop Current Mode configuration: "Enable": enables loop current mode (analog output will operate as a 4 to 20 mA signal consistent with the transmitter output) "Disable": disables loop current mode (analog output will be fixed at 4 mA) Loop test: This function enables the user to test the Analog Output measurement at any value over the full operational range. Select a current value to apply and verify the current output on the loop with a calibrated meter. Note that this function is only available when "Loop mA" (Loop Current mode) is Enabled. D/A trim: perform an analog output calibration at 4.00 and 20.00 mA (0% and 100% output).

Online/Device Setup/Sensors	Sensor	Sensor Config Parameters: Displays the information related to the Sensor Type, Sensor ID Displays range information of the Sensor. The following limits are read only: 　　LRL Lower range limit for sensor 　　URL Upper range limit for sensor 　　LTL: Lower transducer limit for sensor 　　UTL: Upper Transducer limit for sensor Allows user to configure "Lower calib Point","Upper Calib Point", "RTD Type","Sensor Bias" and "Sensor install date"
	Change Sensor Type/Id	Allows user to write the sensor type and Sensor ID.
	Sensor Scratch Pad	Allows user to configure 32 char scratch pad information
	Break Detect	Allows user to enable or disable the break detect

Online/Device Setup/CVD	CVD Activate	CVD ON: CVD feature enabled CVD OFF: CVD feature disabled
Online/Device Setup/CVD Coefficients	Write CVD Coefficients	User can configure below CVD coefficients R0, Alpha, Delta and Beta
	R0	Resistance at 0°C
	Alpha	One of CVD coefficient
	Delta	One of CVD coefficient
	Beta	One of CVD coefficient
Digital Output	Alarm1 Type	Select one of alarm type from below list as Alarm 1 Type None PV High Alarm PV Low Alarm Critical
	Alarm2 Type	Select one of alarm type from below list as Alarm 2 Type None PV High Alarm PV Low Alarm Critical
	Alarm Latch	Select latching option (Disable/Enable/Clear) Enable: This keeps the alarm active even if the condition creating the alarm goes away Disable: Alarm gets clear when fault goes away Clear : A momentary selection which clears a latched alarm without power-cycling or resetting the transmitter
	Alarm Block	ON: The alarm is suppressed until the PV first gets past the alarm set point or band OFF : The alarm can set when the transmitter is first powered up if the current PV is meet the Set point criteria
	Setpoint1	Threshold value to trigger Alarm 1 type. Value can be configured between -999.9 and +9999.9 in PV Engineering units
	Setpoint2	Threshold value to trigger Alarm 2 type. Value can be configured between -999.9 and +9999.9 in PV Engineering units

	Read Screen Info	Displays configured information for each of the eight display screens. Select a screen number to view details of the configurations selected in the "Screen Configuration" menu.

Online/Device Setup/Display Setup
 	
(for Basic Display Only)
	Screen Configuration	The display screen may be customized with the following settings:
		    PV Selection: select the displayed process variable as:
		        Loop Output, Percent Output,
		        Loop PV, CJ Temperature,
		        Sensor, Sensor Resistance
		    Temperature Units: select desired standard Temperature unit.
		    Number of Decimals: select the number of decimal places for the PV display from none to 3.
		    Custom Tag: enter a custom tag name for the screen title up to 14 alphanumeric characters.

	Common Setup	The following screen options are available: Rotation Time: Set the length of time the PV display is visible before rotating to another screen (such as a diagnostic display). Select from 3 to 30 seconds. Screen Rotation: Yes : Rotate the screens based on configured screen rotation time No: Disable screen rotation Contrast Level: Select a display contrast level from 1(low) to 9 (high) or choose the "default" (5).
Online/Device Setup/Review		Displays the current values for all of the pertinent operating parameters listed in this table, plus revision information. Parameters are not configurable in this menu.

Table 7 – Tamper Reporting Logic Implementation with Write Protect

Write Protect Jumper Status	Write Protect Software Status	Tamper Reporting Status	Tamper Alert Posted?	Configuration Change Allowed?
ON	ON	ON	YES	NO
ON	OFF	ON	YES	NO
OFF	ON	ON	YES	NO
OFF	OFF	ON	YES	YES
ON	ON	OFF	NO	NO
ON	OFF	OFF	NO	NO
OFF	ON	OFF	NO	NO
OFF	OFF	OFF	NO	YES

The sections below give some examples as to how to edit the configuration parameters and execute Methods.

4.2.10 Procedure to Enter the Transmitter Tag

1. From the **My Device** menu, make the following menu selections:

   Shortcuts > Device Setup > Basic Setup > Device Information > Tag.
2. Click **Edit**. The **Tag** screen will be displayed.
3. Key in the tag name (for example: STT750) which can be a maximum of eight characters.
4. Click **OK**. The **Send to Device** screen will be displayed.
5. Select the **Tag** check box.
6. Click **Send** to download the change to the Transmitter, or Click **Return** to continue making changes.
7.

4.2.11 Selecting the Process Variable (PV) Unit of Temperature Measurement

Engineering units affect the values of the LRV and URV. After changing the PV engineering units to the Transmitter, verify changes to the units paramter, the LRV, and the URV.

The Temperature measurement can be displayed in one of the pre-programmed engineering units.

1. From **My Device** menu, make the following menu selections:

   Shortcuts > Device Setup > Basic Setup > Device Information > PV Units
2. Click **Edit.** You will be warned that if you change the value of the variable it will change the loop current, which may upset the control process.

3. Click **Yes** to continue. The PV Unit screen will be displayed with a list of measurement units, as follows:

> Deg C
> Deg F
> Deg R
> Kelvin
> mV Ohms

4. Select the desired **PV Unit**, and click **OK**. A Post Edit action message will be displayed, indicating if you select this value, the variables that use it as the units code will start in the previous units until this value is sent to the Transmitter.
5. Click **OK** to continue or **Abort** to discard the change.
6. Click **Send**. The Send to Device screen will be displayed.
7. Select the **PV Unit** check box.
8. Click **Send** to download the change to the Transmitter or **Return** to continue making changes.

4.2.12 Setting PV URV, and LRV Range Values

🔵 STT750 Transmitters are calibrated at the factory with ranges using deg C For a reverse range, enter the upper range value as the LRV and the lower range value as the URV.

The LRV and URV values can be entered with the Toolkit keypad or by applying the corresponding temperature values directly to the Transmitter. Use the following procedure to key in the range values.

1. Starting at the My Device menu, make the following menu selections:
    Shortcuts > Device Setup > Basic Setup > Device Information > Range values
2. Click **Edit**. The "Range value" screen will be displayed.
3. Select **PV LRV** and click **Edit**. You will be warned that if you change the value of the variable it will change the loop current, which may upset the control process.
4. Click **Yes** to continue.
5. Enter the desired PV LRV value. (for example: 5).
6. Click **OK**. The Range Values menu will be displayed
7. Choose **Temperature URV**.
8. Add the desired URV setting value (for example: 45).
9. Press **ENTER**.
10. Select the **PV URV**, and click **Edit**. You will be warned that if you change the value of the variable, it will change the loop current, which may upset the control process.
11. Click **Yes** to continue.
12. Click **Return** to go back to the **Basic Setup** menu.
13. Click **Send**. The Send to Device screen will be displayed.
14. Select the **Range values** check box,
15. Click **Send** to download the change to Transmitter, or Click **Return** to continue making changes.

4.2.13 Setting Range Values for Applied Temperature

When setting the range values using applied Temperature, the URV changes automatically to compensate for any changes in the LRV and to maintain the present span (URV – LRV). When entering the LRV using the Tookit keypad, the URV does not change automatically.
If you use the applied temperature method, and need to change the LRV and URV, **change the LRV first**. You can also use the local zero and span adjustments on the Transmitter to set the LRV and URV values.

1. Starting at the **My Device** menu, make the following menu selections:

    Shortcuts > Device setup > Calibration > Calibration Methods > Apply values.

2. Click **Execute**. You will be warned to remove the loop from automatic control. After doing so, press **OK** to continue.
3. Select **4mA** from the list, and then click **OK**. A message will prompt you to apply a new 4 mA input.
4. Click **OK**; otherwise, click **Abort**.
5. When the **Current applied process value:** is displayed, choose **Select as 4mA value**, and click **OK**.
6. Repeat steps 2 through 4 to set the URV to the applied input Temperature for 20 mA output.
7. Click **Return** to go back to the Calibration menu.
8. Click **Send**. The Send to Device screen will be displayed.
9. Select the **Apply Values** check-box.
10. Click **Send** to download the change to the Transmitter, or click **Return** to continue making changes.

4.2.14 Saving device history

FDC provides you a feature wherein you can save the device configuration snapshot as history. This history record may then be transferred to a central asset management database such as FDM.
Using this feature you can save the device configuration snapshot as device history of a connected device at any given time in a predefined location. The following are the features of save device history option.

- Two formats of history are supported: FDM and DocuMint.
- Only one snapshot per device instance is allowed to be saved and you can save the snapshot of a device any number of times overwriting the existing one.

To save device history, perform the following steps.

1. On Device Home page, tap Tools.
2. Select **Save History** and tap **Select**

The **Save History** page appears.

3.   Enter the **History Record Name** using the keypad and tap **OK**. History Name field accepts alphanumeric characters, underscore, and no other special characters.

4.   Enter the **Device Tag** using the keypad and tap **OK**. Device Tag field accepts alphanumeric characters, underscore, and no other special characters.

Note: The device can be identified with **History Record Name** and **Device Tag** in FDM, once the record is imported in FDM, provided the device is not already present in the FDM network.

5.   Select the **Format**. The following are the available formats:

- FDM
- DocuMint

6.   Tap **Save** to save device history record.

7.   If a history record for this device already exists, the following warning message appears.

8.   Tap **Yes** to overwrite the existing name. A overwrite success message appears.

9.   Tap **OK** to return to **Device Home** page.

4.2.15 Exporting device history records to FDM

The history snapshot saved in FDC can be imported into FDM for record and audit purposes. This is enabled by the standard Import/Export wizard in FDM. This way FDM allows synchronizing the device configuration data through the MC Toolkit handheld.

To export device history from FDC and import it in FDM, perform the following steps.

1. Connect your MC Toolkit handheld to your computer as described earlier.

2. Browse to the folder on your computer, **SD Card > FDC > Resources > History**.

3. The FDC history records are named as per the following convention for the primary name:
   DeviceTag_ManufacturerIDDeviceTypeDeviceRevisionDDRevision_DeviceID

4. Copy the desired Device History Record files (with .fdm extension) from the above mentioned location to a temporary location on FDM Client computer.

5. Use FDM Import/Export wizard to import the history records into FDM. After you import successfully:

- The snapshot would get imported into FDM database and appear as a history record for the corresponding device in FDM.

- The Audit Trail entry for such a record identifies it as being imported through the MC Toolkit handheld.

- If the device is not part of any of the FDM configured networks, it would appear under '**Disconnected Devices'** in FDM network view.

- All operations allowed on Device History Record in FDM will be allowed for the record imported through the MC Toolkit handheld.

Note: For more details on using FDM Import/Export feature, refer to section Importing and Exporting Device History in FDM User's Guide.

4.2.16 Exporting device history records to Documint

To export device history from FDC and import it in FDM, perform the following steps.

1. Connect your MC Toolkit handheld to your computer as described earlier.

2. Browse to the folder on your computer, **SD Card > FDC > Resources > History**.

3. The FDC history records are named as per the following convention for the primary name:
DeviceTag_ManufacturerIDDeviceTypeDeviceRevisionDDRevision_DeviceID

4. Copy the desired Device History Record files (with .xml extension) from the above mentioned location to a temporary location on the DocuMint system.

5. For Importing in DocuMint: Select Procedures > Import or the Import option in the tool bar.

Note: For more details on using DocuMint Import feature, refer to section Importing from XML File in Document Help.

4.2.17 Custom Views

FDC provides you a unique feature wherein you can choose what you want to view in a device and thus creating your own custom views. This is a very convenient utility when you are interested in select few variables in a device and saves you the time for navigating through the menus.
You can create two views per device type with maximum of 10 variables selected for each custom view.
To create/modify the custom views, perform the following.

1. On **Device Home** page, tap **My Views**.

2. Tap Configure and tap Select.

The Configure My Views dialog box appears.

3. To customize **View1** and **View2**, select the variables by checking the box against desired variables.

4. Tap ⬅ or ➡ to navigate to previous and next set of variables.

5. Once done, tap **Options** to select **Save My Views**.

Two custom views are ready with selected variables.
Note: Since a custom view can contain only up to 10 variables each, a warning is displayed if you have selected more than 10 variables.
To rename the views, perform the following.
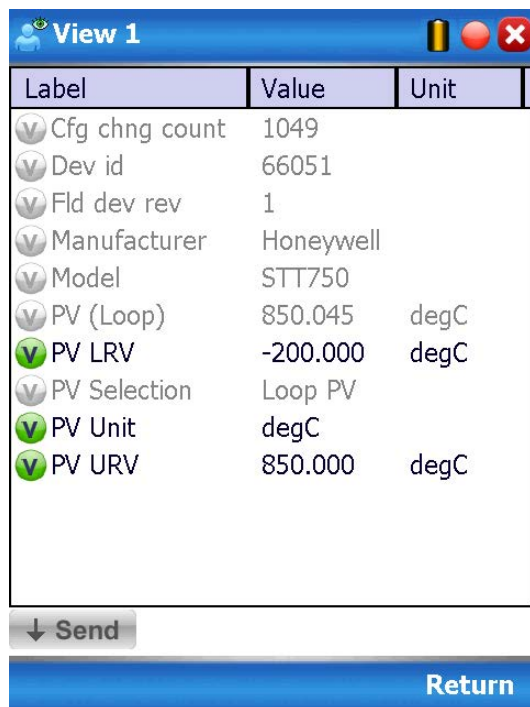
6. Tap **Options** > **Rename View1**.

 A dialog box appears informing you to enter the name.

7. Tap **Ok**.

8. Tap Option>Save to persist the change

9. Tap **Return** to return to My Views page. You would see two options with the names you gave to the newly created views.

Note: To view the custom views, tap **My View 1** > **Select**.
The My View 1 page appears. Example View1 is shown. Based on the connected device model, you can select the applicable parameters

Edit the parameters that are Read / Write and select Send.

For more details on any of the FDC features, refer the "*MC Toolkit User Manual,* document # 34-ST-25-20 (MCT202) or #34-ST-25-50 (MCT404)."

4.2.18 Offline Configuration

4.2.18.1 Overview

Offline Configuration refers to configuring a device when the device is not physically present or communicating with the application. This process enables you to create and save a configuration for a device, even when the device is not there physically. Later when the device becomes available with live communication, the same configuration can be downloaded to the device. This feature enables you to save on device commissioning time and even helps you to replicate the configuration in multiplicity of devices with lesser efforts. Currently, FDC does not support creating offline configuration. However, it supports importing of offline configuration from FDM R310 or later versions. The configurations thus imported can be downloaded to the device from FDC.

The following are the tasks that you need to perform for importing offline configuration in FDC application software and then downloading it to the device.

- Create offline configuration template in FDM
- Save the configuration in FDM in FDM format.
- Import the offline configuration in FDC
- Download the offline configuration to the device

Note: For details on creating and using offline configuration, refer to section Offline configuration in FDM User's Guide.

4.2.18.2 Importing offline configuration

Using this feature you can import offline configuration template. The offline configuration template has to be created in FDM and saved in FDM format. Copy the .fdm files into the storage location of the FDC.

To import an offline configuration, perform the following steps.

1. On the FDC homepage, tap Offline Configuration > Select.

   The **Offline Configurations** page appears.

2. Tap **Options** > **Import**.

   The **Select a File** dialog box appears.

3. Navigate to the location where the offline configuration template is stored.

4. Select the required offline configuration template from the list.

5. Double-tap and the offline configuration template is imported.

   A success message appears.

   Note: In case if the offline configuration template is already imported, an overwrite message appears.

6. Tap **OK** to return to the **Offline Configurations** page. The device details appear on the bottom of the page.

4.2.18.3 Deleting offline configuration

Using this feature you can delete an offline configuration template.
To delete an offline configuration, perform the following steps.

1. On the FDC homepage, tap Offline Configuration > Select.

The **Offline Configurations** page appears.

2. Select the required offline configuration template from the list.

3. Tap **Options** > **Delete**. A warning message appears.

4. Tap **Yes** to delete the offline configuration template.

4.2.18.4 Downloading an offline configuration

Using this feature, you can download the offline configuration when the device is online.
To download an offline configuration, perform the following steps.

1. On the FDC homepage, tap **Offline Configuration > Select**.

The **Offline Configurations** page appears.

2. Select the required offline configuration template from the list.

3. Tap **Options** > **Download**.

The **Offline – Select Variables** page appears with the all the variables.
Note: By default, all the variables selected in FDM will appear as selected and non-editable variables appear in grey color.

4. Select the required variable. In case you select a dependent variable, then variables on which it is dependent on will also be selected and the following warning appears.
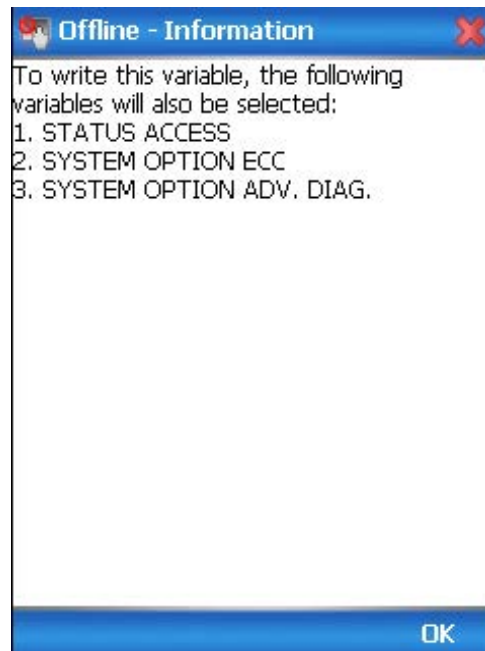
5. Tap **OK** to return to the offline wizard.

6. Tap **Next**.

The Offline – Review and Send page appears with the list of selected variables.

---

7. Tap **Send** and the process to send the variables to the device starts. Once the downloading is complete, the following page appears. Typical screen is shown here.

Note: If the variables are downloaded successfully, status appears as **SUCCESS** in green color; and if failed, status appears as **FAILED** in red color.

8. Tap **Finish** to return to **FDC Homepage**.

This page is left blank intentionally.

5 HART Calibration

5.1 About This Section

This section provides information about calibrating a Transmitter's analog output and measurement range. It also covers the procedure to reset calibration to the default values as a quick alternative to measurement range calibration.

This section includes the following topics:

- How to calibrate a Transmitter's analog output circuit using the Communicator
- How to perform a two-point calibration of a Transmitter
- How to perform a correct reset to return a Transmitter calibration to its default values.

5.1.1 About Calibration

The STT750 SmartLine Transmitter does not require calibration at periodic intervals to maintain accuracy. If a recalibration is required, we recommend that perform a bench calibration with the Transmitter removed from the process and located in a controlled environment to get the best accuracy.

Before you recalibrate a Transmitter's measurement range, you must calibrate its analog output signal. See section 0 for the procedure.

5.1.2 Input Calibration Procedure

5.1.2.1 Correct Input at the Lower Range Value (LRV)

1. After the LRV and URV have been entered, as described in the "Correct Input at Zero" procedure, above, select the **Correct LRV** button on the CALIBRATION display. (See Step 4 in the previous procedure to bring the CALIBRATION screen to the display.)
2. Select the **Correct LRV** button. This message appears:
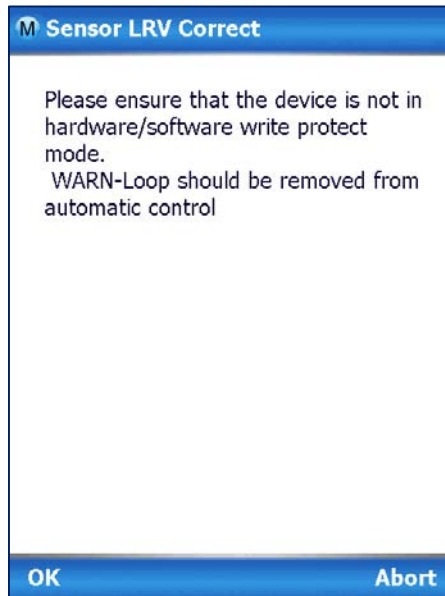
3. Check the device is not in write protect mode and press OK

---

4. Enter calibration date (MM/DD/YY), OK
5. Enter calibration Time (Hour), OK. Entre calibration time (minute), OK
6. Apply Sensor 1 LRV temperature

M Sensor LRV Correct

Apply sensor 1 LRV temperature.

OK   Abort
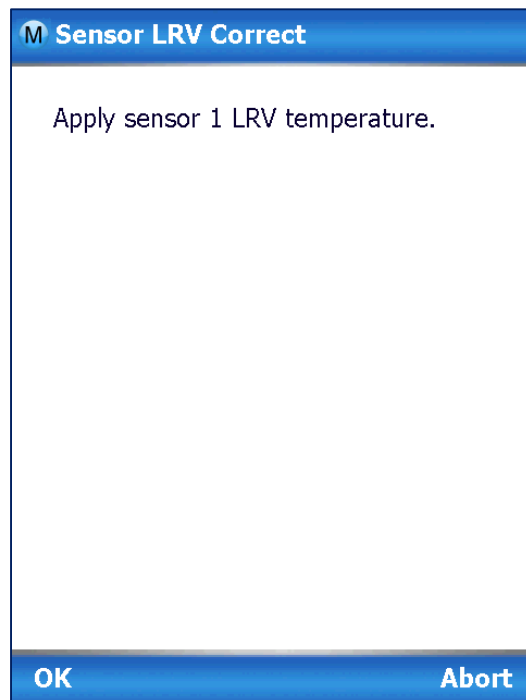
7. Adjust the PV input Temperature to the *exact value of the LRV* entered in the CONFIGURE display. Select the **OK** button.
8. Observe the input Temperature at the applied value; when it is stable, select the **OK** button.

M Sensor LRV Correct

Press OK when temperature is stable

OK   Abort

9. A screen appears to Remove Temperature

Ⓜ Sensor LRV Correct

Remove Temperature

OK   **Abort**
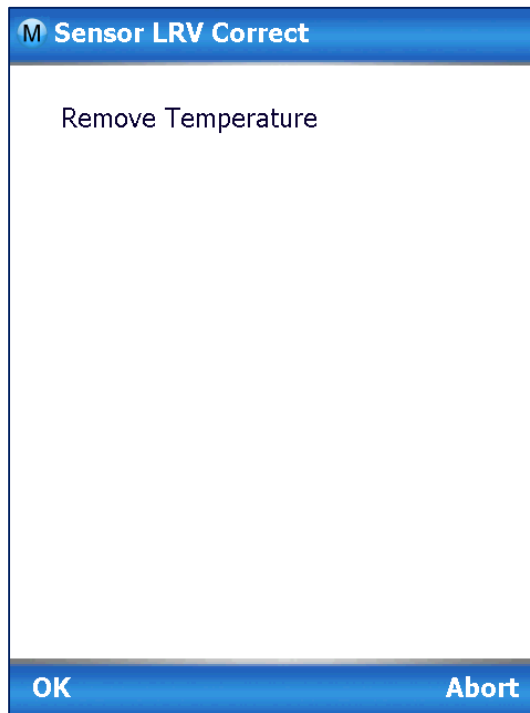
10. When the Transmitter has completed the LRV correction, this message appears:

Ⓜ Sensor LRV Correct

NOTE-Loop may be returned to
automatic control

OK   **Abort**

11. Select **OK** to acknowledge.

5.1.3 Correct Input at URV

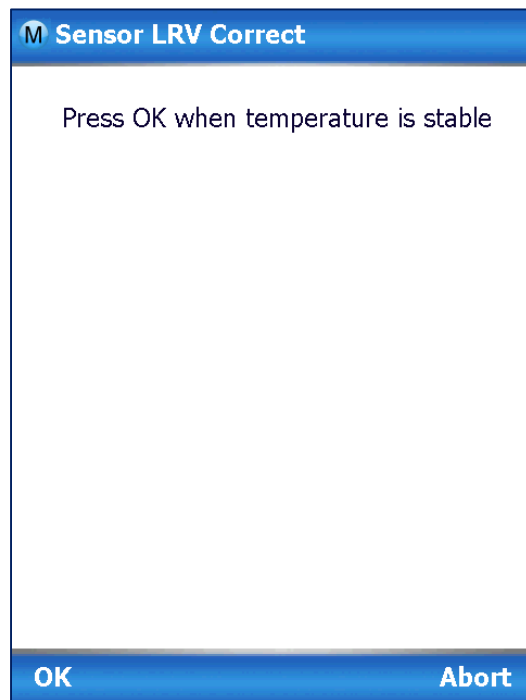1. Select the **Correct URV** button. This message appears.
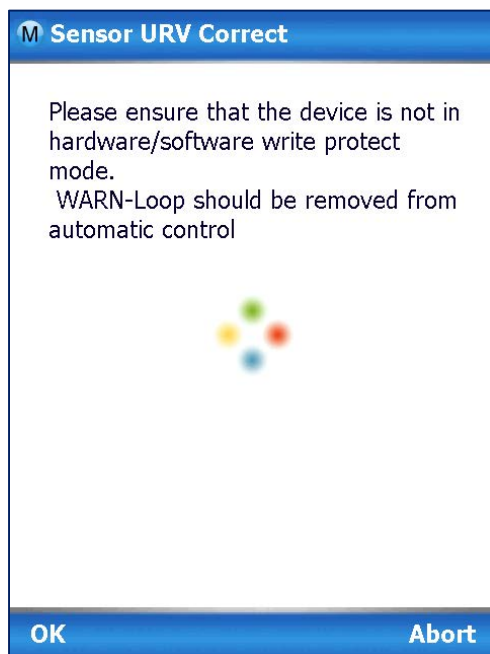
2. Check the device is not in write protect mode and press OK
3. Enter calibration date (MM/DD/YY), OK
4. Enter calibration Time (Hour), OK. Entre calibration time (minute), OK
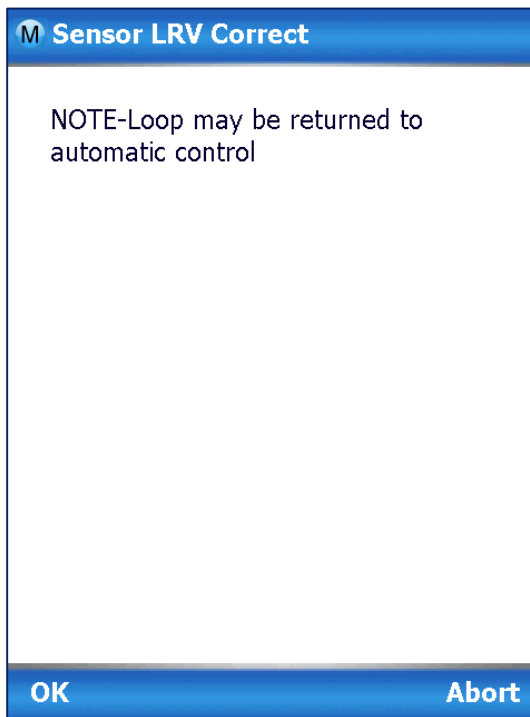5. Apply Sensor 1 URV temperature
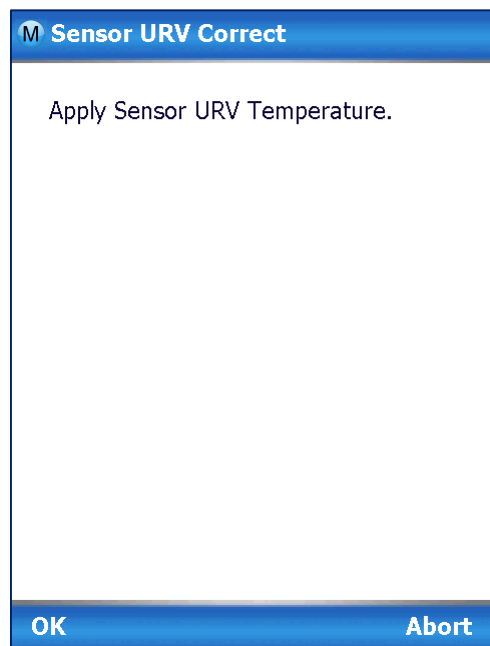
6. Adjust the PV input Temperature to **the *exact value of the URV*** entered in the DE CONFIGURE display. Select the **OK** button.

7. Observe the input Temperature at the applied value; when it is stable, select the **OK** button.
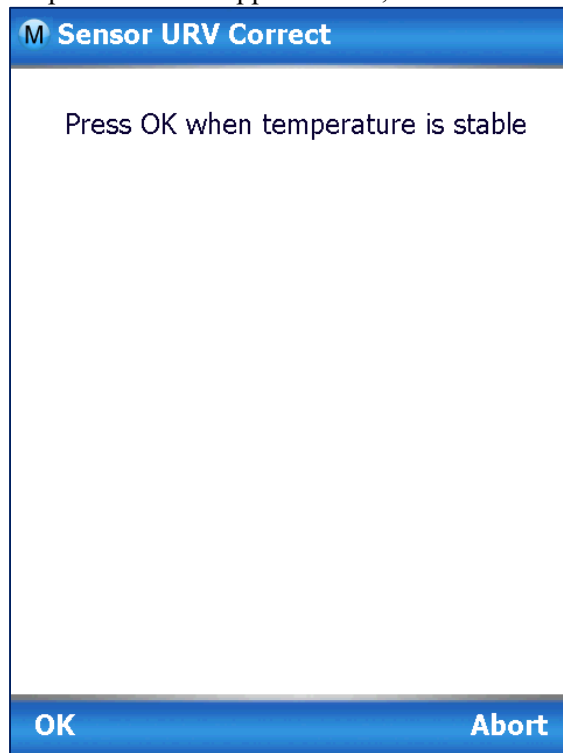
8. A screen appears to Remove Temperature
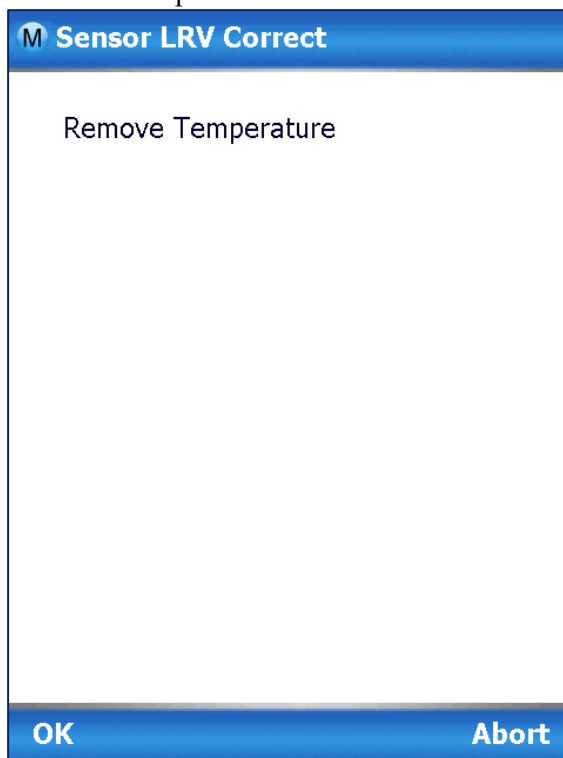
9. When the transmitter has completed the URV correction, this message appears.
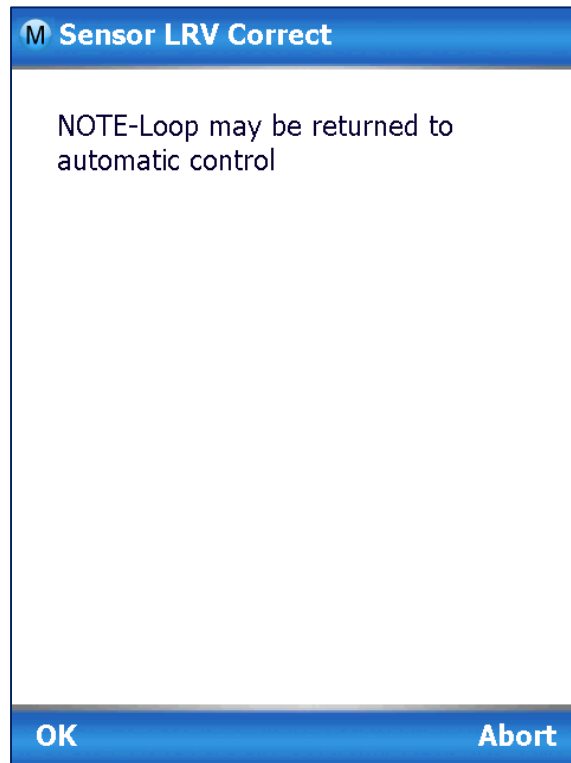
10. Select **OK** to acknowledge.

All procedures in this manual assume the Transmitter is configured for Loop Current Mode enabled).

5.1.4 Equipment Required

Depending on the selected calibration, you may need any of the following test equipment items to accurately calibrate the Transmitter:
- Digital Voltmeter or millimeter with 0.01% accuracy or better
- MC Toolkit Calibration standard Temperature source with a 0.02% accuracy
- 250 ohm resistor with 0.01% tolerance or better.

5.2 Analog Output Signal Calibration

With a Transmitter in its constant current source mode, its analog output circuit can be calibrated at 0 (zero) % and 100% levels. It is not necessary to remove the Transmitter from service.
The following procedure is used for analog output signal calibration. You can calculate milliamperes of current from a voltage measurement as follows: Dc milliamps = 1000 X voltage/resistance

 IMPORTANT: Be sure that the accuracy of the resistor is 0.01% or better for current measurements made by voltage drop.

1. Check that the Write Protect Jumper is in the "OFF" position.
2. Connect the MC Toolkit across loop wiring, and turn it on. See Figure 5 for a sample test equipment hookup.
3. Launch the FDC application.
4. On the Home page, select Online and establish a connection with the device as follows
5. Check that the device is not in the Write Protect mode.
6. Select the My Device menu, and choose from the following menus:
    a. Device setup \ Calibration \ Calibration Methods \ D/A trim
7. You will be prompted to remove the loop from automatic control; after removing the loop from automatic control, press OK.
8. When a prompt appears, connect a precision milliammeter or voltmeter (0.01% accuracy or better) in the loop to check readings, and press OK. The following prompts will be displayed:
    - Setting field device to output to 4mA. Press OK
    - Enter meter value. Key in the meter value, and press ENTER.
    - Field device output 4.000 mA equal to reference meter?
      1 Yes, 2 No
        - If the reference meter is not equal to the field device output then select No and press Enter
        - Key in the new meter value
        - Return back to the "Enter Meter Value" prompt until the field device output equals the reference meter
        - Select Yes and press Enter
9. The following display prompts will appear:
    - Setting field device output to 20mA. Press OK
    - Enter meter value. Key in the meter value, and press ENTER.
    - Field device output 20.000 mA equal to reference meter?
      1 Yes, 2 No
        - If the reference meter is not equal to the field device output then select No and press Enter
        - Key in the new meter value
        - Return back to the "Enter Meter Value" prompt until the field device output equals the reference meter
        - Select Yes and press Enter
10. The prompt notifies you that the field device will be returned to its original output

5.3 Calibrating Analog Inputs

The STT750 SmartLine Temperature Transmitter supports two-point input calibration. This means that when two points in a range are calibrated, all points in that range adjust to the calibration.
LRV and the URV should always be calibrated both at the same time.

This procedure assumes that the Transmitter has been removed from the process and is located in a controlled environment.

IMPORTANT! You must have a precision calibrator source with an accuracy of 0.02% or better to do an input calibration. Note that the factory calibrates STT750 SmartLine Temperature Transmitters temperature in deg C.

5.3.1 Correcting the Lower Range Value (LRV)

1. Check that the Write Protect Jumper is in the "OFF" position.
2. See Figure 5 for typical test connections. Connect the power supply and communicator to the signal terminals of the Transmitter terminal block.
3. Connect the precision calibrator source to the sensor (to be corrected) inputs of the transmitter.
4. Turn on the power supply, and allow the Transmitter to become stable.
5. Turn the MC Toolkit on, start the FDC application.
6. On the FDC Home page, select Online, and establish communication with the Transmitter.
7. Check that the device is not in the Write Protect mode.
8. The Lower Calibration Point and Upper Calibration Point values have to be entered in the respective sensor config parameters in the Sensors menu. These calibration points are used in the LRV Correct and URV Correct methods (not LRV and URV).
9. Select the My Device menu, and choose from the following selections:
    a. Device Setup \ Calibration \ Calibration Methods \ Sensor (1 or 2) LRV Correct
10. You will be prompted to remove the loop from automatic control. After removing the loop from automatic control, press OK.
11. When prompted, adjust the temperature source to apply value equal to the Lower Calibration Point, and press OK.
12. When the temperature stabilizes, wait for 5 seconds, then press OK.
13. When prompted, remove temperature.
14. On the next prompt – "Please enter Calibration Date in MM/DD/YYYY format. Enter the Calibration date (for example "05/27/2009") and press Enter.
15. On the next prompt - "Please enter the current calibration time in 24 Hr format (Hours Field)", enter the Hours field HH (for example, "12"), and press ENTER
16. On the next prompt – "Please enter current Calibration Time (Minute field)," enter the Minutes field MM (for example "23"), and press ENTER.
17. When prompted to return the loop to automatic control, press ENTER

NOTE: If you are calibrating LRV and URV at the same time do not power down and start up again after the LRV steps, just go to step 1 of the URV procedure below.

5.3.2 Correcting the Upper Range Value (URV)

Assuming that you have just finished the LRV correct, then select the My Device menu, and choose one of the following options:

1.   Select the My Device menu, and choose one of the following options:
      a.   Device Setup \ Calibration \ Calibration Methods \ Sensor (1 or 2) URV Correct
2.   You will be prompted to remove the loop from automatic control. After removing the loop from automatic control, press OK.
3.   When prompted, adjust the temperature source to apply value equal to the Upper Calibration Point, and press OK.
4.   When the temperature stabilizes, wait for 5 seconds, then press OK.
5.   When prompted, remove temperature.
6.   On the next prompt – "Please enter Calibration Date in MM/DD/YYYY format. Enter the Calibration date (for example "05/27/2009") and press Enter.
7.   On the next prompt - "Please enter the current calibration time in 24 Hr format (Hours Field)", enter the Hours field HH (for example, "12"), and press ENTER
8.   On the next prompt – "Please enter current Calibration Time (Minute field)," enter the Minutes field MM (example "23"), and press ENTER.
9.   When prompted to return the loop to automatic control, press ENTER

5.3.3 Resetting Calibration

STT750 SmartLine HART Temperature Transmitter can erase incorrect calibration data by resetting the device back to *final factory calibration*, which is performed per the ordered range. The Corrects Reset command returns the zero and span calibration factors to the original precise factory calibration.

Incorrect or inaccurate user calibrations may be reset by performing a Reset Correct operation. This calibration reset will return the device to *original factory calibration accuracy*.   Factory calibration is extremely accurate and user calibration is not typically recommended. However, if user calibration to a customized range is desired, it is recommended that the input calibration procedures be performed again after the calibration reset.

The following procedure is used to reset calibration data to factory calibrated range using the communicator.

1.   Connect the MC Toolkit per Figure 5 across the loop wiring and turn on.
2.   Turn the MC Toolkit on, start the FDC application.
3.   On the FDC Home page, select Online, and establish communication with the Transmitter.
4.   Select the My Device menu, and choose from the following selections:
      •   Device Setup \ Calibration \ Calibration Methods \ Reset Corrects (Sensor)
5.   You will be prompted to remove the loop from automatic control. After removing the loop from automatic control, press OK.
6.   You will be notified that a Reset Corrects is about to occur. Press OK
7.   When the message "Reset Corrects OK" appears, press OK. The previous calibration "Corrects" are removed and calibration is reset to the factory values.
8.   When prompted to return the loop to automatic control, press OK

5.3.4 STT750 Calibration Records

A history of the date and time of the last three Calibration procedures is available for the HART device. Run the Methods and follow the screen prompts to read the Calibration Records.

Select "My Device\Device Setup\Calibration" to select the following calibration records
- Correct URV Records
- Correct LRV Records
- Reset Corrects Records for Sensor

Table 8 – Calibration Records

Calibration Record	Description
Correct LRV Records	
Curr LRV Correct	Date and Time of current LRV correct done displayed in mm/dd/yyyy format
Last LRVCorrect	Date and Time of last LRV correct done displayed in mm/dd/yyyy format
Prev LRV Correct	Date and Time of previous LRV correct done displayed in mm/dd/yyyy format
Correct URV Records	
Curr URV Correct	Date and Time of current URV correct done displayed in mm/dd/yyyy format
Last URV Correct	Date and Time of last URV correct done displayed in mm/dd/yyyy format
Prev URV Correct	Date and Time of previous URV correct done displayed in mm/dd/yyyy format
Reset Correct Records	
Curr Corrects Sensor Rec	Date and Time of current Reset corrects done for Sensor displayed in mm/dd/yyyy format
Last Corrects Sensor Rec	Date and Time of last Reset corrects done for Sensor displayed in mm/dd/yyyy format
Prev Corrects Sensor Rec	Date and Time of previous Reset corrects done for Sensor displayed in mm/dd/yyyy format

6 HART Advanced Diagnostics

6.1 About This Section

This section provides information about the Advanced Diagnostic features in the STT750 SmartLine Temperature Transmitter.

6.2 Advanced Diagnostics

Table 9 – Viewing Advanced Diagnostics

What you want to view	What to do
- Install date - PV (Process Variable) Tracking Diagnostics - SV (CJ Temperature) Tracking Diagnostics - ET (Electronics Temperature) Tracking Diagnostics - Stress Life - Service Life - Operating Voltage Tracking Diagnostics - AVDD (Sensor Supply Voltage) Tracking Diagnostics - Sensor CPU Temp. Tracking - Power Up Diagnostics	Select Start/FDC to Launch the FDC application on the MC Toolkit. On the Home page, select Online and establish connection with the device. Select My Device\Diagnostics\Adv Diagnostics.

6.2.1 Install Date

Install Date	Parameter	Description	Date of device installation. Date displayed in mm/dd/yyyy format where mm=month, dd=day, yyyy=year
		Set-up	User enters a date once during device lifetime. Once date is entered no further updates are possible and value becomes read only and is permanently saved.

6.2.2 PV Tracking Diagnostics

Table 10 – Maximum PV Tracking

UTL (Max PV Limit)	Parameter	Description	Upper Transducer Limit: PV(temperature) specified upper operating limit in user-selected units
		Set-up	None.
Max PV	Parameter	Description	Maximum PV that the device has experienced in user selected units.
		Set-up	None. Value initialized to Min PV Limit value prior to leaving the factory. Updates to current PV automatically when powered at user site after one minute.
		NVM	Update after every 7.5 hours.
Time Above Upper Stress Limit	Parameter	Description	Accumulation of minutes that Temperature measured by the device has been above "PV Upper Stress Limit".
		Set-up	None – initialized to zero prior to leaving the factory.
		NVM	Backup once each 7.5 hour period
Time Since Last PV Up	Method	Description	Time that has passed since the last time device's PV passed above "PV Upper Stress Limit" (in days, hours and minutes).
		Set-up	None – initialized to zero prior to leaving the factory.
		NVM	Backup once each 7.5 hour period

Table 11 – Minimum PV Tracking

LTL (Min PV Limit)	Parameter	Description	Lower Transducer Limit: PV(temperature) specified lower operating limit in user-selected units	
		Set-up	None.	
PV Lower Limit for Stress Condition	Method			
Min PV	Parameter	Description	Minimum PV that the device has experienced in user selected units.	
		Set-up	None. Value initialized to Max PV Limit value prior to leaving the factory. Updates to current PV automatically when powered at user site after one minute.	
		NVM	Update after every 7.5 hours	
Time Below Lower Stress Limit	Parameter	Description	Accumulation of minutes that Temperature measured by the device has been below the value of "PV Lower Stress Limit".	
		Set-up	None.	
		NVM	Backup once each 8 hour period	
Time Since Last PV Down	Method	Description	Time that has passed since the last time device's PV passed below the value of "PV Lower Stress Limit" (in days, hours and minutes).	
		Set-up	None – initialized to zero prior to leaving the factory.	
		NVM	Backup once each 7.5 hour period	

6.2.3 SV Tracking

Table 12 – Maximum SV Tracking

Max SV Limit	Parameter	Description	CJ Temperature (SV) upper operating limit from specification.
		Set-up	None.
Max SV Value	Parameter	Description	Highest Temperature ever experienced by the device.
		Set-up	None - value initialized to Min SV Limit value prior to leaving the factory. Updates to current CJ Temperature automatically when powered at user site after one minute.
		NVM	Update after every 8 hours.
Time Above Upper Stress Limit	Parameter	Description	Accumulation of minutes that device's CJ Temperature has been above the value of "SV Upper Stress Limit".
		Set-up	None.
		NVM	Backup once each 8 hour period
Time Since Last SV Up	Method	Description	Time that has passed since the last time device's CJ Temperature has passed above the value of "SV Upper Stress Limit" (in days, hours and minutes).
		Set-up	None.
		NVM	Backup once each 8 hour period

Table 13 – Minimum SV Tracking

Min SV Limit	Parameter	Description	CJ Temperature (SV) lower operating limit from specification.
		Set-up	None.
Min SV Value	Parameter	Description	Lowest CJ Temperature ever experienced by the device.
		Set-up	None - value initialized to Max SV Limit value prior to leaving the factory. Updates to current CJ Temperature automatically when powered at user site after one minute.
		NVM	Update after every 8 hours.
Time Below Lower Stress Limit	Parameter	Description	Accumulation of minutes that device has been below the value of "SV Lower Stress Limit".
		Set-up	None.
		NVM	Backup once each 8 hour period
Time Since Last SV Down	Method	Description	Time that has passed since the last time device's CJ Temperature has passed below the value of "SV Lower Stress Limit" (in days, hours, and minutes).
		Set-up	None.
		NVM	Backup once each 8 hour period

6.2.4 ET Tracking Diagnostics

Table 14 – Maximum ET Diagnostics

Max ET Limit	Parameter	Description	Electronics Temperature (ET) upper operating limit from specification. Units are same degree units as has been selected for SV (Secondary Variable).
		Set-up	None.
ET Upper Limit for Stress Condition		Description	Actual limit used in "Time Above Limit" and "Time Since Last Event". Value is equal to "Max ET Limit" less 10% of limits range.
		Example	Electronics Temperature range is -40°C (-40°F_ to 85°C (185°F) for a total of 125°C (225°F). "ET Upper Stress Limit"= 85°C 185°F - 10% of 125°C (225°F) = 72.5°C (162.5°F).
		Set-up	None – calculation is automatic.
Max ET Value	Parameter	Description	Highest Electronics Temperature ever experienced by the device. Units are same degree units as has been selected for SV (Secondary Variable).
		Set-up	None.
		NVM	Update every 7.5 hour.
Time Above Upper Stress Limit	Parameter	Description	Accumulation of minutes that device's Electronics Temperature has been above the value of "ET Upper Stress Limit".
		Set-up	None.
		NVM	Backup once each 8 hour period
Time Since Last ET Up	Method	Description	Time that has passed since the last time device's Electronics Temperature has passed above the value of "ET Upper Stress Limit" (in days, hours and minutes).
		Set-up	None.
		NVM	Backup once each 7.5 hour period

Table 15 – Minimum ET Diagnostics

Min ET Limit	Parameter	Description	Electronics Temperature (ET) lower operating limit from specification. Units are same degree units as has been selected for SV (Secondary Variable).
		Set-up	None.
ET Lower Limit for Stress Condition		Description	Actual limit used in "Time Below Limit" and "Time Since Last Event". Value is equal to "Min ET Limit" plus 10% of limits range.
		Example	The ET limits are -40°C (-40°F) to 85°C (185°F) ET lower stress limit -40°C (-40°F) + 10% of 125°C (225°F) = -27.5°C (-17.5°F)
		Set-up	None – calculation is automatic.
Min ET Value	Parameter	Description	Lowest Electronics Temperature ever experienced by the device. Units are same degree units as has been selected for SV (Secondary Variable).
		Set-up	None.
		NVM	Update every 7.5 hour.
Time Below Lower Stress Limit	Parameter	Description	Accumulation of minutes that device's Electronics Temperature has been below the value of "ET Lower Stress Limit".
		Set-up	None.
		NVM	Backup once each 8 hour period
Time Since Last ET Down	Method	Description	Time that has passed since the last time device's Electronics Temperature has passed below the value of "ET Lower Stress Limit" (in days, hours, and minutes).
		Set-up	None.
		NVM	Backup once each 7.5 hour period

6.2.5 % Stress Life

% Stress Life	Parameter	Description	Percent of service life spent in stressful conditions. Indicates the % of service life where electronics temperature is within 10% of respective range limits.% of Service life spent either in 10% of lower limit range or 10% of upper limit range.
		Set-up	None.
		NVM	Backup once each 7.5 hour period

6.2.6 % Service Life

% Service Life	Parameter	Description	Percent of expected Service Life that device has been in service. Value is based on electronics temperature. Service life accumulates faster at higher temperatures with an exponential relationship.
		Set-up	None.
		NVM	Backup once each 7.5 hour period

6.2.7   Operating Voltage Diagnostics

Table 16 – Operating Voltage Diagnostics

Current Op Voltage	Parameter	Description	Operating voltage available at device terminals.
		Set-up	None – units always in volts.
		NVM	none
		Note	**No accuracy is specified for this measurement!** **This value is intended to be used for informational purposes only and should not be used for control.**
Min Op Voltage	Parameter	Description	Minimum operating voltage experienced by device at terminals since last reset of operating voltage parameters.
		Set-up	User can reset as desired using method described in item below.
		NVM	Backup once each 7.5 hour period
Time Since Last Voltage Low	Method	Description	Displays time since last minimum operating voltage event in minutes.
		Set-up	User can reset as desired using method described in item below.
		NVM	Update every 7.5 hour.
Reset Operating Voltage Parameters	Method	Description	Causes "Min Op Voltage" to be set to 32 volts and "Time Since Last Event" to be reset to zero. Within a short period of time "Min Op Voltage" will assume operating voltage value.
		Set-up	User actuates as desired.

6.2.8 AVDD Tracking Diagnostics

Table 17 – Maximum and Minimum AVDD Tracking

Max AVDD	Parameter	Description	Maximum Sensor Supply Voltage experienced by device since last reset of voltage parameters.
Time since last AVDD Up	Method	Description	Displays time since last Sensor Supply Voltage was above last Max AVDD
Min AVDD	Method	Description	Minimum Sensor Supply voltage experienced by device since last reset of voltage parameters.
Time since Last AVDD Down	Method	Description	Displays time since last Sensor Supply Voltage was below last Min AVDD

6.2.9 Sensor CPU Temperature Tracking Diagnostics

Table 18 – Maximum Sensor CPU Temperature Tracking

Max Sensor CPU Temp.	Parameter	Description	Maximum Sensor CPU Temperature experienced by device
		Set-up	none
Time Above Upper Stress Limit	Parameter	Description	Accumulation of minutes that Sensor CPU Temperature has been above the value of Max Sensor CPU Temp.
		Set-up	None.
		NVM	Backup once each 8 hour period
Time Since Last Sensor CPU Temp. Up	Method	Description	Time that has passed since the last time Sensor CPU Temp has passed above the value of "Max Sensor CPU Temp" (in days, hours and minutes).
		Set-up	none
		NVM	Backup once each 8 hour period

Table 19 – Minimum Sensor CPU Temperature Tracking

Min Sensor CPU Temp.	Parameter	Description	Minimum Sensor CPU Temperature experienced by device
		Set-up	none
Time Below Upper Stress Limit	Parameter	Description	Accumulation of minutes that Sensor CPU Temperature has been below the value or Min Sensor CPU Temp.
		Set-up	none
		NVM	Backup once each 8 hour period
Time Since Last Sensor CPU Temp. Down	Method	Description	Time that has passed since the last time Sensor CPU Temperature has passed below the value of "Min Sensor CPU Temp" (in days, hours and minutes).
		Set-up	none
		NVM	Backup once each 8 hour period

6.2.10 Power Up Diagnostics

Table 20 – Power Up Diagnostics

Pwr fail counter	Parameter	Description	Total number of power resets experienced by the unit.
		Set-up	None – initialized to zero prior to leaving factory.
		NVM	Backup once each 8 hour period
		Note	Only one power failure in each 8 hour period is counted.
Time since last power fail	Method	Description	Displays time since last power-up in minutes.
		Set-up	None.
		NVM	Backup once each 8 hour period–

7 Troubleshooting and Maintenance

Table 21 lists both critical and non-critical (warning conditions) diagnostics.

7.1 HART Diagnostic Messages

Table 21 critical and non-critical HART diagnostic messages.

Table 21 – HART Diagnostic Messages

Critical Diagnostics (Failure Conditions)	Non-Critical Diagnostics (Warning Conditions)
Temperature Sensor Module Failure	Excess Cal Correct (Excess LRV Correct and/or Span correct for Sensor Input)
Sensor Comm. Timeout	Sensor Module Over Temperature
	Cold Junction Out of Range Error
	Sensor Input Open
	Sensor Input TB5, TB6, TB7 & TB8 Open
	No Factory Calibration
	Supply voltage Fault (External Supply voltage Fail)
	Communication Module Over Temperature
	No DAC compensation
	Unreliable communication between Sensor and Comm Modules
	Display NVM fault

7.2 HART Diagnostic Details

Table 22 lists and describes the HART critical and non-critical HART diagnostic details.

Table 22 – HART Critical and Non-Critical Diagnostic Details

	Active Diags	# #	Description
	Sensor Module	OK FAULT	FAULT: There is a problem with the Sensor Module
	Comm Module	OK FAULT	FAULT: There is a problem with the Electronics Module (HART)
	Sensor Comm	OK FAULT	FAULT: There is a problem with the interface between the Sensor Module and the Electronics Module.
	Input	OK FAULT	FAULT: There is a problem with the Input sensor
	Active Diags	# #	Shows the number of Non-Critical Diagnostics that are currently active
	Cal Correct	OK EXCESSIVE	EXCESSIVE: Input applied exceeds 5% of expected value
	Sensor Temp	OK OUT OF RANGE	Electronics temperature is greater than 85 °C
	Input Range	OK OUT OF RANGE	OUT OF RANGE: Input temperature is greater than Sensor URL or less than Sensor LRL
	CJ Range	OK OUT OF RANGE	OUT OF RANGE: Cold Junction temperature is greater than 85C or less than -40C.
	Input	OK OPEN	OPEN: Input is open.
	Factory Cal	OK NO FACTORY CAL	The transmitter has not been calibrated by the factory.
	Supply Voltage	OK LOW OR HIGH	LOW: Supply voltage is below the low specification limit. HIGH: Supply voltage is above the high specification limit.
	Comm Module Temp	OK OVER TEMP	OVERTEMP: Electronics temperature is greater than 85°C or less than -40°C.
	DAC Temp Comp HART only	OK NO COMPENSATION	The DAC has not been compensated for temperature effects. This is a factory operation.
	Sensor Comm	OK SUSPECT	SUSPECT: The interface between the Temperature Sensor Module and the Electronics Module is experiencing intermittent communication failures.
	Display Setup HART only	OK NVM Corrupt	NVM Corrupt: The Display memory is corrupt.
	Internal Power	OK LOW OR HIGH	LOW: Internal power is below 2.9V" and "HIGH: Internal power is above 3.4V.

8 Using DTMs

8.1 Introduction

STT750 HART models support DTMs running on Pactware or FDM / Experion. To set up the DTM network on the FDM/Experion, refer to the *FDM/Experion User Guide*. In this manual, the procedure is given to run the STT750 HART DTM on Pactware (Version 4.1 or above).

8.2 Components

In order to be able to use the HART DTM you need the following:

- PACTware or some other Container application.
- Microsoft .NET Framework
- Latest HART Communication DTM: Free version of HART Communication DTM available for download from CodeWrights website.
- Honeywell HART DTM Library
- Viator modem from MacTek: RS-232 interface for HART Networks

8.3 Downloads

- **Download 1**: Pactware 4.x and .NET 2.0
  Download from www.pactware.com
- **Download 2**: HART Communication DTM\
  Download from http://www.codewrights.biz/
- **Download 3**: Honeywell HART DTM Library
  Download from HPS web site

8.4 Procedure to Install and Run the DTM

1. Install the Download 1, 2, or 3 above.
2. Connect the Transmitter to the 30 V DC power supply with a 250 ohm loop resistor.
3. Connect the Viator modem terminals to the Transmitter power terminals.
4. Connect the Viator modem DB9 connector to the PC COM port.
5. Run Pactware. Select Update Device Catalog before adding Device (before adding HART Comm DTM).
6. Add Device – Add HART Comm DTM.
7. Right click on HART DTM, select Connect.
8. Right Click on HART Comm DTM and select Add device.
9. Add the Device DTM from for your device from the list (for example: STT750 DevRev 1).
10. Right Click on Device DTM, and select Connect.
11. Right click on Device DTM, and select Parameter/online parameterization. You should see Status "Connected" to be able to do configuration, calibration etc.
12. Browse through the menus to access various parameters/functions

The following sections provide a high level overview of STT750 DTM screens. The Menu structure is similar to the MC Toolkit FDC application and behavior of the parameters / methods is the same as the MC Toolkit FDC application. Refer to Table 6 for a complete listing of all the parameters and details. In the following sections, emphasis is given to show the various DTM screens.

8.5 STT750 Online Parameterization

On selecting Parameter/Online Parameterization, the DTM home page will be displayed. Typical home page screen is shown below. Based on the device type respective parameters will be shown.
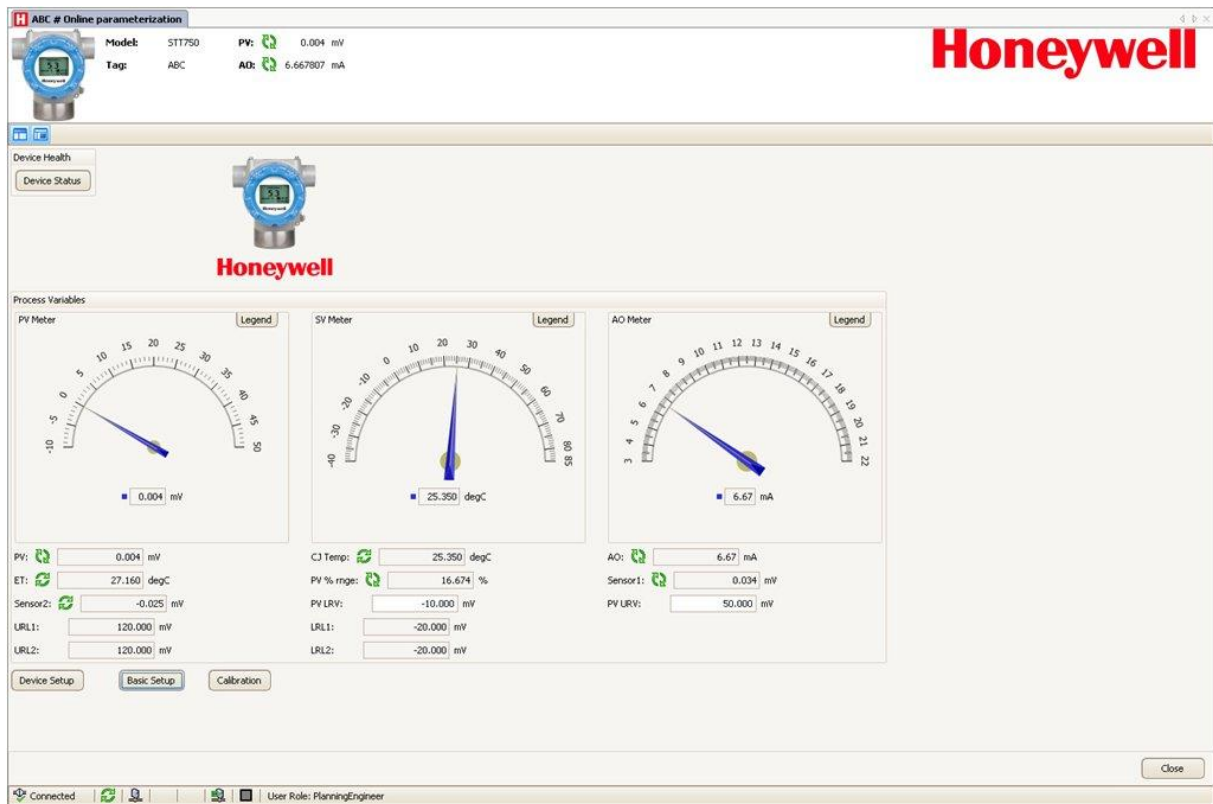
8.5.1 Device Health:

Shows Overall Device Status Image and "Device Status" Button/Link that takes you to the Device Status screen.
Overall Device Status will be either Normal, Warning or Failure depending upon the health of the device:

 Overall Device Status will be shown on each of the DTM pages so that the user can get the current status of the device from any screen

8.5.2 Device Icon / Honeywell Logo:

Shows the Honeywell Logo, Transmitter icon.

8.5.3 Process Variables:

Shows PV, SV, TV, % Range and Loop Current.

8.5.4 Shortcuts:

Device Setup:
- Provides Tabs to access any of the functions : Basic Setup, Calibration, Process Variables, Diagnostics, Device Status, Services, Detailed Setup, Sensors, Alarm, Display setup, Review

Basic Setup:
- Provides Device Setup information (Tag, Device Type, MB Type etc.)

Calibration:
- Provides access to all the Calibration functions

 Refer to the Table 6 for more details

8.6   Basic Setup Page

This page will show:
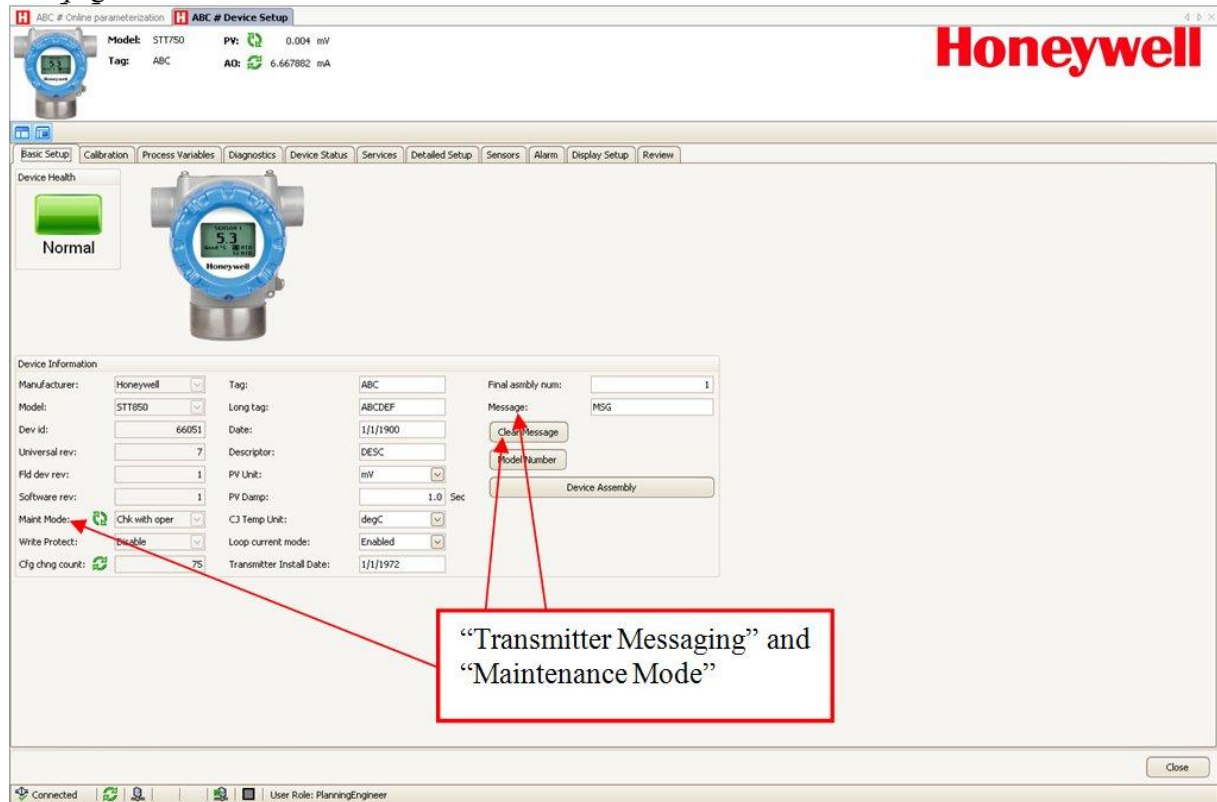
8.6.1 Device Information:

Allows access to both read only parameters and read/write parameters.
Provides access to Message, Clear Message and Maint Mode.

Refer to Table 6 for more details

8.6.2 Model Number:

Shows the Model number.

8.6.3 Device Assembly:

Shows the Blow out Image of STT750.

8.7   STT750 Offline Parameterization

On selecting Parameter/ Parameterization, the Offline parameter configuration page will be displayed.
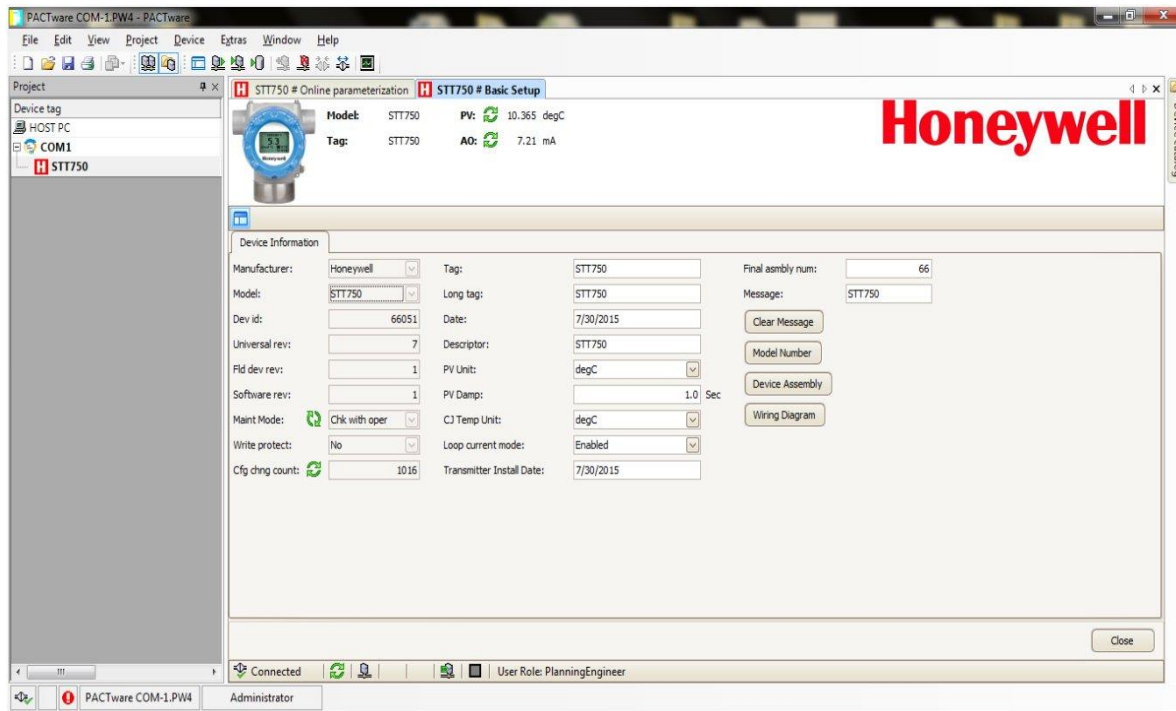
Select Device / Load to Device to download the Offline Configuration to the connected device.

9 HART DD Binary File Format Compatibility Matrix

"Host - STT750 - HART DD binary file format" compatibility matrix	
Host	DD file format to be used
Experion R410	Fm8
Experion R400 to R300	Fm6
Experion below R300	fms
FDM R430	Fm8
FDM R410 – R302	Fm6
FDM Below R302	fms

 Refer the respective Tools' User Manual for details on loading the DD file on these Tools.

Glossary

AWG	American Wire Gauge
C/J	Cold Junction
EMI	Electromagnetic Interference
FTA	Field Termination Assembly
Hz	Hertz
LRL	Lower Range Limit
LRV	Lower Range Value
mAdc	Milliamperes Direct Current
mV	Millivolts
NPT	National Pipe Thread
NVM	Non-Volatile Memory
T	Temperature
PM	Process Manager
PV	Process Variable
PWA	Printed Wiring Assembly
RFI	Radio Frequency Interference
RTD	Resistance Temperature Detector
SFC	Smart Field Communicator
STIM	Temperature Transmitter Interface Module
STIMV IOP	Temperature Transmitter Interface Multivariable Input/Output Processor
T/C	Thermocouple
URL	Upper Range Limit
URV	Upper Range Value
US	Universal Station
Vac	Volts Alternating Current
Vdc	Volts Direct Current
HART	Highway Addressable Remote Transducer
HCF	HART Communication Foundation
EEPROM	Electrically Erasable Programmable Read Only Memory

INDEX

Sales and Service

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

ASIA PACIFIC

Honeywell Process Solutions,
(TAC) **hfs-tac-support@honeywell.com**

Australia
Honeywell Limited
Phone: +(61) 7-3846 1255
FAX: +(61) 7-3840 6481
Toll Free 1300-36-39-36
Toll Free Fax:
1300-36-04-70

China – PRC - Shanghai
Honeywell China Inc.
Phone: (86-21) 5257-4568
Fax: (86-21) 6237-2826

Singapore
Honeywell Pte Ltd.
Phone: +(65) 6580 3278
Fax: +(65) 6445-3033

South Korea
Honeywell Korea Co Ltd
Phone: +(822) 799 6114
Fax: +(822) 792 9015

EMEA

Honeywell Process Solutions,
Phone: + 80012026455 or
+44 (0)1344 656000

Email: (Sales)
FP-Sales-Apps@Honeywell.com
or
(TAC)
hfs-tac-support@honeywell.com

AMERICA'S

Honeywell Process Solutions,
Phone: (TAC) 1-800-423-9883 or
215/641-3610
(Sales) 1-800-343-0228

Email: (Sales)
FP-Sales-Apps@Honeywell.com
or
(TAC)
hfs-tac-support@honeywell.com

For more information
To learn more about SmartLine Transmitters,
visit **www.honeywellprocess.com**
Or contact your Honeywell Account Manager

Process Solutions
Honeywell
1250 W Sam Houston Pkwy S
Houston, TX 77042

Honeywell Control Systems Ltd
Honeywell House, Skimped Hill Lane
Bracknell, England, RG12 1EB

Shanghai City Centre, 100 Jungi Road
Shanghai, China 20061

www.honeywellprocess.com

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